A REVISION OF THE SOUTH AMERICAN SPECIES IN THE GENUS NEOATHYREUS HOWDEN AND MARTÍNEZ (COLEOPTERA, SCARABAEIDAE, GEOTRUPINAE)

By

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ABSTRACT

Fourty-four South American species are included in the genus Neoathyreus Howden and Martínez. Twenty-one previously proposed names are considered valid and five are considered synonyms. Twenty-three new species are described: accinctus from Colombia; acutus from Bolivia, Brazil, and Peru; anfractus from Brazil; boosi from Ecuador; brazilensis from Brazil; caesariatus from Brazil; cuspinotatus from Brazil; glaseri from Ecuador; illotus from Brazil, Guyana, and French Guiana; inermis from Brazil and Peru; latidorsalis from Brazil; lepidus from Argentina; lingi from Ecuador; lobus from Argentina; martinezorum from Argentina and Bolivia; obscurus from Brazil; ornatus from Peru; peckorum from Colombia; perryae from Ecuador and Peru; politus from Brazil; rufobrunneus from Ecuador and Peru; rufoventris from Peru; and versicolor from Ecuador. One new species, perryae, is not only represented by recently collected material but is also known by a pronotum from the Talara tar seeps, Peru, dated at 14,000 years B.P. All species are illustrated by Scanning Electron Micrographs.

CONTENTS

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INTRODUCTION

The tribe Athyreini was characterized by Howden and Martínez (1963) with four included genera; Athyreus Macleay, Neoathyreus Howden & Martínez, Parathyreus Howden and Martínez, and Pseudoathyreus Howden and Martínez. Subsequently Athyreus (Howden & Martínez, 1978) and Parathyreus (Howden, 1985) were completely revised and the Central American and West Indian Athyreini reviewed (Howden, 1964, 1978). The present revision completes the coverage of the New World species of Athyreini. The African-Oriental genus Pseudoathyreus still needs study.

Types of all of the species of Neoathyreus have been seen and most dissected except for the three described by Macleay and flavithorax (Arribalzaga). The Macleay types could not be found but it is possible that they are in his collection currently in Sydney, Australia. The three names were applied with some confidence based not only on Macleay's descriptions and localities but also on the same names being used on some of the older material seen by Macleay's contemporaries. The type of flavithorax was thoroughly described and subsequently it has been compared to a closely allied species by Martínez (1951); its placement is not in doubt.

This project was started and all material borrowed with the expectation that Antonio Martínez would be able to join me as co-author. Unfortunately at the last moment other commitments prevented him from coming to Ottawa. With all of the types and material at hand it was necessary to complete the project without his able assistance.

In previous papers on Athyreini the lack of series or of specimens with good data has been discussed and this paucity of material continues to be a problem. The number of species in the present paper represented by one or two specimens each indicates that the present coverage of the genus is probably far from complete.

Neoathyreus Howden and Martínez

Neoathyreus Howden and Martínez, 1963, p. 350.

Type-species: Athyreus tridentatus Macleay, by original designation.

Species placed in the genus can be recognized by the following combination of characters: sexes similar; head in most species trituberculate, carnate between tubercles; pronotum anteriorly with fossa on each side near margin behind eye; lateral pronotal marginal bead complete or briefly interrupted near lateral fovea, fovea shallow; pronotum in many species with median concavity; elytra lacking abrupt, transverse basal carina, carina if present incomplete or rounded; elytra in most species lacking deep striae, few species with five distinct striae on elytron; under surface

of fore tibia smooth, in a few species moderately, irregularly punctate; small carina present at ventral base of apical tooth of fore tibia, indistinct carina usually present at base of penultimate tooth; fore coxa not extending to pronotal margin; fore coxal cavity rounded laterally and with spine at outer posterior margin; metasternum flat to slightly convex medially, median line faintly indicated, edge of anterior declivity bluntly to sharply pointed; hind tarsi moderately thickened, not densely punctate; single, longitudinal carina present on the first, usually the second and rarely the third tarsal segments, never present on the fourth; largest tibial spur variable in length, extending from middle to beyond second tarsal segment.

Members of Neoathyreus can usually be recognized by the lack of the distinct, basal margin of the elytra; fore coxae not visible through lateral fovea; and fore coxal cavity with distinct spine on outer margin. The moderate size of most species and similarity in the sexes are also useful for recognizing the genus.

Explanation of special terms

Most species of Neoathyreus have three clypeal tubercles (Figs. 1-3): a lateral tubercle present on each side above the base of the mandible and a median tubercle that may be either anterior to the line between the lateral tubercles, or in line with them, or obsolete. In the descriptions, if the median tubercle is said to be anterior in position, it is anterior to the line of the lateral tubercles.

A posterior clypeal carina extends between the three tubercles or between the lateral tubercles if the median tubercle is obsolete. In addition, an oblique clypeal carina (Fig. 1) may extend from each side of the median tubercle anteriorly to the anterior lateral clypeal angle. In other species there is an anterior transverse clypeal carina (Fig. 2) extending across the anterior edge of the clypeus. Occasionally the carina is interrupted medially or only vaguely indicated (Fig. 3).

The pronotum usually has a central depression or concavity. On each side of the concavity, extending from the anterior third nearly to the posterior margin is a carina varying considerably in shape between species. The carina on each side of the concavity is referred to as the inner carina. In most species there are one or two carinae between the inner carina and the lateral pronotal margin. This single (or double) carina(e) is referred to as the outer carina(e). Below the lateral pronotal fovea the pronotal margin (Fig. 4) may be abruptly indented and the marginal bead absent. Other species lack the indentation and have the bead complete.

The etymology of all new scientific names except patronyms can be found in Brown (1956).

COLLECTIONS STUDIED

In citing collections studied, the name of the city in which the museum is situated is used, and for a private collection the name of the individual is cited. The collections studied and the curators are as follows:

Berlin	Zoologisches Museum an der Humboldt-Universität zu Berlin. Dr. Manfred Uhlig.

Brussels	Institut Royal des Science Naturelles. Dr. L. Baert.
Cambridge	Museum of Comparative Zoology, Harvard University. Dr. A. Newton.
Chicago	Field Museum of Natural History. Drs. S. Ashe, J. Kethley.
Dresden	Staatliches Museum für Tierkunde. Dr. R. Krause.
Eberswalde	Institute für Pfanzenschutzforschung. Dr. G. Morge.
Geneva	Muséum D'Histoire naturelle. Dr. Ivan Löbl.
Leiden	Rijksmuseum van Natuurlijke Historie. Dr. J. Krikken.
London	British Museum (Natural History). Mr. L. Jessop.
Maracay	Instituto de Zoología Agrícola. Dr. F. Fernandez-Yepez, Mr. Jose A. Clavijo A.
Munich	Zoologische Staatssammlung. Dr. G. Scherer.
New York	American Museum of Natural History. Dr. Lee Herman.
Ottawa	Biosystematics Research Institute. Dr. A. Smetana.
Oxford	Hope Entomological Collections, University Museum. Dr. M.J. Scoble.
Paris	Muséum National d'Histoire Naturelle. Drs. R.-P. Dechambre, Y. Cambefort, Mr. Patrick Arnaud.
Pittsburgh	Carnegie Museum of Natural History, Mr. R.L. Davidson.
San Francisco	California Academy of Sciences. Dr. D. Kavanaugh.
São Paulo	Museu de Zoologia, Universidade de São Paulo. Dr. U. Martins.
Tucumán	Universidad Nacional de Tucumán. Dr. A. Willink.

Toronto	Royal Ontario Museum. Dr. G. Wiggins.
Washington	United States National Museum. Drs. R. Gordon, P. Spangler.
Arnaud	Mr. P. Arnaud, Paris, France.
Boos	Mr. J. Boos, Quito, Ecuador.
Glaser	Dr. J. Glaser, Baltimore, Maryland.
Hardy	Dr. A. Hardy, Sacramento, California.
Ratcliffe	Dr. B. Ratcliffe, Lincoln, Nebraska.

Key to the species of Neoathyreus H. & M.

1. Pronotum on each side with carina anterior to lateral fovea extending to lateral marginal bead (ridge); carina at least as high as marginal bead at junction 2
Pronotum on each side with or without carina anterior to lateral fovea, carina if present not extending to and merging with marginal bead 9

2. Pronotal midline not with elevated keel along midline posterior to anterior margin; small to moderate sized species not exceeding 15 mm in length 3
Pronotal midline posterior to anterior margin with strongly elevated, elongate keel (Fig. 7) on anterior third; size large for genus, over 15 mm in length; western Ecuador . . . . . 1. glaseri n. sp.

3. Pronotum with inner carina on each side of concavity with sharply obtuse, elevated angle near anterior end 4
Pronotum with inner carina on each side of concavity lacking abrupt, elevated angle 5

4. Apical tarsomere of posterior tarsus with distinct tubercle on upper surface near apex (Fig. 12); median clypeal tubercle elevated above posterior carina, tubercle with acute apex; Argentina, Paraguay . . . . . 2. arribalzagai (Martínez)
Apical tarsomere of posterior tarsus lacking tubercle; median clypeal tubercle with apex obtusely angled or transverse; Argentina, Brazil, Paraguay, Uruguay . . . . . 3. flavithorax (Arribalzaga)

5. Dorsal color of various shades of brown or black, elytra occasionally with vague purple sheen 6
Dorsal color green or brownish with distinct greenish tinge; Brazil . . . . . 4. viridis (Boucomont)

6. Pronotum with inner carina at or near anterior fourth bent toward lateral margin; specimens dorsally tan to brown . 7
Pronotum with inner carina in anterior half not abruptly bent toward lateral margin; specimens very dark brown or black 8

7. Pronotum (Fig. 21) with inner carinae separated from each other at narrowest point by three or more times width of one carina at that point; pronotum moderately concave between inner carinae in anterior two thirds; Bahia, Brazil . . . . . 5. anfractus n. sp.
Pronotum (Fig. 22) with inner carinae separated from each other at narrowest point by one and one-half to two times width of one carina at that point; pronotum feebly concave between inner carinae; Mato Grosso, Brazil . . . . . 6. latidorsalis n. sp.

8. Pronotum with each inner carina very broad, separated from adjacent posterior outer carina by no more than width of outer carina (Fig. 26); Bahia, Brazil . . . . . 7. purpureipennis (Westwood)
Pronotum with each inner carina of moderate width, separated from adjacent posterior outer carina by two or more times width of outer carina (Fig. 29); Bahia, Brazil . . . . . 8. anthracinus (Klug)

9. Pronotum with only inner carina on each side of concavity present 10
Pronotum with both inner and outer carina present, outer carina sometimes appearing as laterally directed posterior extension of inner carina 13

10. Pronotum with small to moderate sized tubercle on or just posterior to anterior margin at midline; dorsally brown, variegated, or black 11
Pronotum with large (0.5 mm or more), laterally compressed tubercle (Fig. 32) or ridge with sharp posterior apex; dorsally brown; Minas Gerais, Rio de Janeiro, Brazil . . . . . 9. cuspinotatus n. sp.

11. Fore tibia with five or more teeth on outer margin; pronotal concavity distinctly wider anteriorly 12
Fore tibia with four teeth on outer margin; pronotal concavity (Fig. 35) only slightly wider anteriorly; Rio de Janeiro, Brazil . . . . . 10. bidentatus (Macleay) (in part)

12. Each inner pronotal carina inwardly angulate or sinuate near middle; carinae not obviously divergent near anterior end; length usually exceeding 8.3 mm; dorsally tan to brown; Argentina, Paraguay . . . . . 11. sexdentatus (Laporte)
Each inner pronotal carina arcuate; carinae divergent anteriorly; length usually less than 8.3 mm; bicolored brown to black or nearly uniformly very dark brown or black; Bolivia, Brazil . . . . . 12. centromaculatus (Felsche)

13. Pronotal midline with tubercle or longitudinal keel posterior to and not contiguous with anterior margin (small additional tubercle may also be present on anterior margin) 14
Pronotal midline frequently with tubercle or low keel on or contiguous with anterior margin (bead), lacking more posterior median projection 20

14. Midline of pronotal concavity with tubercle or keel present on or near posterior margin of concavity; second tubercle may also be present on anterior margin at midline 15
Midline of pronotal concavity with laterally compressed tubercle or keel present at anterior end or middle of concavity; in species with anterior tubercle, tubercle not contiguous with margin 17

15. Posterior pronotal tubercle peg-like, sides almost parallel to rounded apex; dorsum usually bicolored, sides of pronotum tan to brown, remainder of dorsum darker . . . 16
Posterior pronotal tubercle forming an anteriorly directed keel, top same height as and merging with inner carinae (Fig. 45); dorsum relatively uniform tan or brown; Colombia . . . . . 13. peckorum n. sp.

16. Anterior pronotal marginal bead not thickened or tuberculate at midline; surface of concavity becoming gradually less punctate-tuberculate toward posterior of concavity (Fig. 48); Venezuela . . . . . 14. corniculatus (Felsche)
Anterior pronotal marginal bead thickened posteriorly into V-shaped tubercle (V sometimes very small); surface of concavity becoming abruptly less punctate-tuberculate near posterior of concavity (Fig. 51); Argentina . . . . . 15. lobus n. sp.

17. Clypeus with median tubercle absent or lower than lateral tubercles; pronotal tubercle on midline near anterior third; concavity posterior to tubercle 18
Clypeus with median tubercle strongly developed, anterior in position to lateral tubercles; pronotal tubercle or keel on midline near middle; concavity poorly developed, shallow, lateral and posterior to tubercle 19

18. Lateral pronotal margin below fovea indented, marginal bead interrupted; inner pronotal carina sinuate (Fig. 54); Colombia . . . . . 16. reichii (Westwood)
Lateral pronotal margin at most slightly indented below fovea, marginal bead not broken; inner carina on each side of concavity elevated and acutely angulate near middle of concavity (Fig. 58); Colombia . . 17. pholas (Westwood)

19. Pronotal midline near center with keel slanted posteriorly, longer than high (Fig. 61); inner carina on each side obtusely angulate (depressed) in line just posterior to

posterior end of keel; Colombia, Peru . .18. centralis (Westwood)
Pronotal midline near center with upright, blade-like tubercle higher than long (Fig. 66); inner carina on each side arcuate, lacking angles; Ecuador . . . .19. lingi n. sp.

20. Clypeus on each side with strongly developed oblique carina extending up anterior lateral side of prominent median tubercle; tubercle more prominent (higher) than lateral tubercles, with anterior face vertical or nearly so . . . . 21.
Clypeus on each side lacking oblique carina or with the carina broken or very irregular near base of low median tubercle; tubercle slightly anterior to lateral tubercles and at most only slightly better developed 27

21. Pronotum on each side of concavity with inner carina sharply angulate 22
Pronotum on each side of concavity with inner carina lacking sharp angulation 24

22. Sharp angulation of inner carina acute, slanted toward midline; lateral thirds of pronotum lighter in color 23
Angulation of inner carina nearly vertical, right angled or obtuse; pronotal color almost uniform. 45

23. Inner carina posterior to angulation with distinctly delimited inner margin; lateral clypeal tubercles unusually prominent, upright (Fig. 72); Ecuador . . . . . 21. boosi n. sp.
Inner carina posterior to angulation lacking clearly delimited inner margin; lateral clypeal tubercles small, slanted anteriorly (Fig. 73); Santa Catarina, Brazil . . . . . 22. catharinae (Bates)

24. Length usually less than 12 mm; anterior pronotal margin with tubercle on midline small 25
Length usually greater than 12 mm; anterior pronotal margin with tubercle on midline pronounced 26

25. Elytral intervals shining; fore tibia with five or more teeth; pronotum (Fig. 76) with short, distinct secondary carina at right angle to margin anterior to lateral fovea; Argentina, Brazil . . . . . 23. corinthius (Klug)
Elytral intervals dull; fore tibia with four teeth; pronotum (Fig. 35) lacking carina anterior to fovea; Brazil . . . . . 10. bidentatus (Macleay) (in part)

26. Pronotal concavity (Fig. 80) closely punctate in anterior two-thirds; sides of concavity near middle tumid on each side of depressed midline; Brazil . 24. tridentatus (Macleay)
Pronotal concavity (Fig. 83) with, at most, only small scattered punctures, surface appearing highly polished; bottom of concavity almost flat, not tumid at sides; Brazil . . . . . 25. politus n. sp.

27. Fore tibia with four teeth on outer margin (an obtusely angled basal swelling is not considered a tooth) 28
Fore tibia with five or more teeth on outer margin 34

28. Lateral pronotal margin with marginal bead broken (absent) below fovea 29
Lateral pronotal margin with marginal bead unbroken (may be shallowly indented) 30

29. Clypeus on each side anteriorly with poorly defined oblique carina extending toward median tubercle; pronotum as in Fig. 86; dorsum tan or brown; northern South America to Mexico . . . . . 26. excavatus (Laporte)
Clypeus anteriorly with transverse carina; pronotum as in Fig. 89; dorsum dark brown or black; northern South America, Panama . . . . . 27. lanei (Martínez)

30. Clypeus with anterior carina(e) lacking or with poorly defined oblique carina on each side; dorsum of uniform color or variegated 31
Clypeus anteriorly with transverse carina (Fig. 92); dorsum with sides of pronotum lighter in color; Goyas, Brazil . . . . . 28. obscurus n. sp.

31. Pronotum and elytra densely setose (typical for genus), most setae longer than five times width of one pronotal puncture or granule 32
Pronotum (Fig. 97) and elytra, except near margins, with fine, short to minute, inconspicuous setae; most setae no more than three times as long as width of one pronotal granule; western Peru . . . . . 29. ornatus n. sp.

32. Small species less than 12 mm in length; pronotum on each side with inner carina posteriorly not abruptly bent toward middle 33
Moderate sized species over 12 mm in length; pronotum on each side with inner carina posteriorly bent inwardly, and extending to midline (Fig. 98); Brazil . 30. caesariatus n. sp.

33. Pronotum laterally with fine carina at right angle to margin anterior to fovea, carina not obviously fusing with marginal bead (Fig. 101); dorsum uniformly brown to dark brown; Brazil, French Guiana . . . . . 31. illotus n. sp.
Pronotum laterally lacking carina just anterior to fovea (Fig. 104); dorsum variegated tan to very dark brown; Ecuador . . . . . 32. versicolor n. sp.

34. Pronotum laterally with marginal bead broken (absent) below fovea 35
Pronotum laterally with marginal bead unbroken 39

35. Pronotum with inner carinae lacking upright, sharp angulations 36

Pronotum on each side with inner carina with upright, sharp, acute angle near anterior end of carina (Fig. 107); Argentina, Bolivia . . . . . 33. martinezorum n. sp.

36. Pronotum on each side with inner carina inwardly bowed or angulate and thickened near middle of carina, dorsum (in non-teneral specimens) very dark to black 37
Pronotum on each side with inner carina not noticeably inwardly bowed or angulate near middle, carina of relatively uniform width; dorsum tan to brown or bicolored 38

37. Elytra punctate-granulate, small punctures obvious, surface appearing only moderately roughened, dull; pronotum as in Fig. 110; Ecuador . 34. latecavatus (Boucomont)
Elytra closely granulate, very rough, shining; pronotum as in Fig. 113; Ecuador, Peru . . . . . .35. rufobrunneus n. sp.

38. Inner pronotal carina (Fig. 120) arcuate or very slightly sinuous, gradually convergent with opposite carina posteriorly, less so posterior to concavity; clypeus anteriorly with partial to complete transverse carina . . . 44
Inner pronotal carina (Fig. 116) strongly curved inwardly in posterior half before becoming parallel to midline posterior to concavity; clypeus anteriorly on each side with trace of oblique carina; Ecuador, Peru . . 36. perryae n. sp.

39. Clypeus with median tubercle absent or distinctly smaller and lower than lateral tubercles 40
Clypeus with median tubercle as high or higher than lateral tubercles 41

40. Clypeus with three tubercles; pronotum (Fig. 123) with posterior edge of inner carina angulate near midline; Ecuador, Panama . . . . . 38. lyriferus Howden & Gill
Clypeus with two tubercles (three in small specimens); pronotum (Fig. 126) with posterior edge of inner carina rounded near midline; Colombia . . . .39. accinctus n. sp.

41. Pronotum with inner carina on each side unbroken, uninterrupted 42
Pronotum (Fig. 129) having two inner carinae on each side, one carina anterior and more lateral in position and ending near posterior third of pronotum, second carina on same side much closer to midline and with anterior end beginning just anterior to posterior end of anterior carina; Argentina . . . . . 40. lepidus n. sp.

42. Inner pronotal carina inwardly angulate near middle, sinuous, or arcuate 43
Inner pronotal carina (Fig. 132) with an abrupt, upwardly directed angulation near anterior end of carina; Bolivia . . . . . 41. acutus n. sp.

43. Inner pronotal carina not inwardly angulate or bent inwardly and thickened near middle 44
Inner pronotal carina (Fig. 135) inwardly angulate or bent inwardly and thickened near middle; Brazil . . . . . 42. brazilensis n. sp.

44. Inner pronotal carina (Fig. 120) slightly arcuate outwardly and very gradually converging with opposite carina to end of concavity near posterior third of pronotum; dorsum tan to brown; widely distributed to Amazon region and south to Argentina . . . . . 37. lanuginosus (Klug)
Inner pronotal carina (Fig. 138) most widely separated from opposite carina at anterior end, then converging toward midline to middle of pronotum, then carina nearly parallel with midline to posterior end of carina; dorsum very dark brown with sides of pronotum reddish brown; Brazil, Peru . . . . . 43. inermis n. sp.

45. Anterior pronotal margin between fossae appearing obtusely angled at midline when viewed from posterior, apex of angulation with small tubercle (Fig. 69); Goyas, Brazil . . . . . 20. goyasensis (Boucomont)
Anterior pronotal margin evenly arched between fossae; tubercle at midline lacking (Fig. 141); Peru . . . . . 44. rufoventris n. sp.

1. Neoathyreus glaseri n. sp.

Figures 7-10, Map 1

HOLOTYPE. Male, length 19.1 mm, greatest width 12.5 mm. Dorsally black, with bluish or purple tinge along margins of elytra, most pronounced laterally. Clypeus with oblique and posterior carina strongly developed; median tubercle (worn) with anterior face rising vertically above clypeal margin; lateral tubercle on each side positioned above mandibular insertion, height only slightly less than median tubercle. Vertex between eyes deeply, broadly concave, concavity extending under edge of pronotal margin; sides of concavity granulate, central portion smooth; scattered, short setae present in granular areas near eyes. Pronotum (Figs. 7, 8) with distinct fossa on each side contiguous with anterior marginal bead behind eye; fossa four to five times width of adjacent bead, and with feeble groove directed posteriorly for approximately 0.5 mm; pronotal margin between fossae evenly arcuate, bead of uniform thickness, lacking tubercle at midline; midline 0.4 mm posterior to marginal bead with large, elongate, elevated keel, keel approximately 2.0 mm high, 2.5 mm long, top edge of keel generally parallel with pronotal surface on either side, area on either side of keel elevated, concavity present posteriorly. Inner pronotal carina on each side arising approximately 1.5 mm posterior to fossa, carina nearly parallel with midline to posterior third where inwardly arcuate to indented midline; outer posterior margin of each carina adjacent to midline with broad, posteriorly directed, angulate lobe; two inner carinae conjointly on each side of keel and surrounding broad, deep concavity posterior to keel; surface of concavity irregularly granulate, sparsely so in some areas near

sides; midline of concavity distinctly impressed, smooth. Pronotum on each side lateral to inner carina with two outer carinae; one carina present anterior to deep circular lateral fovea; carina merging with lateral bead of pronotal margin, extending two thirds of distance to inner carina near middle; posterior outer carina almost divided into two parts, 1.0 mm portion behind and slightly below lateral fovea, then 1.0 mm obsolete portion and a posterior 4.0 mm posterior portion positioned midway between posterior inner carina and lateral margin adjacent to posterior angle. Lateral pronotal margin on each side below fovea broadly, shallowly indented between junction of anterior outer carina with margin and abrupt median angle; marginal bead greatly reduced in indented portion of margin. Elytron with three or four striae feebly indicated by depressed irregular rows of punctures, most of surface coarsely, contiguously punctate; most punctures each with fine, short, inconspicuous seta. Metasternum between middle coxae very feebly convex, midline anteriorly forming low, sharp keel, anterior end sharp; anterior edge obtusely angled on either side of sharp point; surface of metasternum with moderate sized shallow punctures, each with relatively short reddish-brown seta. Fore tibia with six teeth on outer margin, teeth worn, basal tooth indistinct on right tibia. Genitalia as in figs. 9, 10.

ALLOTYPE. Female, length 15.0 mm, greatest width 8.9 mm. Dorsally black with distinct bluish tinge. Similar to holotype except as follows: clypeal tubercles smaller, less elevated; vertex with concave area reduced in size and depth, not extending to pronotal margin; pronotum with median keel reduced in height, concave area posterior to keel shallow, narrower than in male; inner carina on each side lower, much less strongly arcuate, inner carinae closer together; elytron with striae more pronounced; fore tibia with only five teeth on outer margin; pygidium more convex.

TYPE MATERIAL: Holotype, male, Ecuador, Santa Domingo, IV. 1982 (Howden). Allotype, female, Ecuador, Quininde [= Rosa Zarate] (Howden).

REMARKS. The unique, raised, anterior median pronotal keel and the odd outer carinae will immediately distinguish glaseri from other species of Neoathyreus. The closest relatives of glaseri probably are in the pholas complex, but it is not a close relationship.

The species is named for Dr. John Glaser who very generously gave me the holotype. He has also loaned me specimens of several other species used in this study.

2. Neoathyreus arribalzagai (Martínez)

Figures 11-14, Map 1

Athyreus arribalzagai Martínez, 1951, p. 109.

TYPE. Male, labeled "Argentina, Pcia de Corrientes, Dep. de Ituzaingo, isla Apipé Grande, XI-945"; in Martinez collection.

MALES. Length 9.5 to 12.1 mm, greatest width 6.2 to 7.9 mm. Color dorsally green with elytra occasionally light brown with distinct greenish color centrally. Clypeus with both oblique and posterior carinae strongly developed; median tubercle moderately elevated above lateral tubercles, apex narrow. Vertex almost flat, granular. Pronotum (Fig. 11) with small fossa on each side behind eye contiguous with anterior marginal bead; diameter of fossa equal to or slightly more than width of adjacent

marginal bead. Pronotum with inner arcuate carina on each side arising just posterior to fossa, carina rising abruptly to tubercle at anterior fifth, then inwardly arcuate to within 1.0 mm of posterior margin where it becomes parallel to slightly divergent, terminating approximately 0.1 mm before posterior marginal bead; concavity broad, shallowly concave in median two-thirds, midline feebly impressed, surface except near carinae closely granulate. Outer carina on each side divided into two parts of nearly equal length, posterior portion feebly arcuate, slightly closer to lateral posterior margin than to inner carina; anterior portion present anterior to lateral fovea and merging with lateral marginal bead; lateral pronotal marginal bead unbroken. Each elytron with four or five feebly elevated convex intervals between suture and humeral umbone, areas between intervals irregularly punctate-setose. Mesosternum between middle coxae slightly convex, anterior edge at midline obtusely angulate; surface with widely spaced, moderate sized setose punctures. Fore tibia with four teeth on outer margin. Hind tarsus with terminal segment with tubercle on dorsal surface (Fig. 12); a character apparently unique to this species. Genital capsule with apex angulate. Genitalia as in figs. 13, 14.

FEMALES. Length 9.4 to 12.9 mm, greatest width 6.3 to 8.1 mm. Differing only very slightly from males: median clypeal tubercle and inner pronotal carina slightly lower than in males of equal size; pygidium more convex.

MATERIAL EXAMINED: 4 males, 3 females.

BRAZIL - Amazonas: Humaitá (?) [probably Humaitá, Paraguay].

PARAGUAY - Alto Paraná: Kohenau. Caaguazú: Col. Sudetia, 320 m, XII. Sapucay. Villarrica, X.

Specimens are in: Geneva, London, São Paulo, Arnaud, Howden.

REMARKS. This species can be separated from all other Neoathyreus by the presence of a seemingly unique character; i.e., the apical segment of the hind tarsus has a distinct tubercle (Fig. 12) on the dorsal surface. If both hind tarsi are missing (as in most specimens seen) the species is close to all green specimens of flavithorax but can be separated from that species by the number of teeth on the outer margin of the fore tibia, four for arribalzagai, five or six for flavithorax.

3. Neoathyreus flavithorax (Arribalzaga)

Figures 15-17, Map 1

Athyreus flavithorax Arribalzaga, 1880, p. 146; Boucomont, 1932, p. 269; Martínez, 1951, p. 112.

TYPE. Sex not given. Buenos Aires, Argentina, probably in Buenos Aires.

MALES. Length 9.8 to 12.7 mm, greatest width 6.4 to 7.1 mm. Dorsally entirely green or with head, pronotal margins and elytra dark green to green, majority of pronotum light reddish brown to dark greenish brown. Clypeus with both oblique and posterior carinae strongly developed; median tubercle only moderately higher than lateral tubercles, blunt at apex, blunt apex varying in width from narrow to unusually wide, particularly so in all green specimens. Vertex very feebly, broadly concave; surface granulate, occasionally only feebly so near posterior midline. Pronotum (Fig. 15) with small fossa on each side behind eye contiguous with anterior marginal bead, fossa three to four times width of adjacent bead; anterior

margin at midline elevated to oblique, sharp angle or small tubercle. Pronotum with inner carina on each side arising approximately 0.5 mm behind margin in line with outer edge of gena; carina outwardly arcuate to sharp, elevated angle approximately in transverse line with lateral foveae, then inwardly arcuate to posterior sixth of pronotum where carina parallels midline, terminating approximately 0.1 mm before posterior marginal bead. Concavity between inner carinae broad, shallowly concave in median two-thirds, midline feebly, broadly impressed; surface variable, lateral portion adjacent to carinae smooth, median two-thirds finely granulate with scattered minute punctures in specimens with testaceous thorax to more coarsely punctate-granulate in specimens with totally green thoraxes. Outer pronotal carina on each side divided into two parts; posterior portion, midway between inner carina and posterior inwardly arcuate lateral angle, nearly straight and approximately 1.0 mm long; anterior portion about 0.9 mm in length, positioned just anterior to lateral fovea and fusing with lateral marginal bead; lateral pronotal marginal bead unbroken. Each elytron with two or three elevated intervals between suture and umbone except between raised intervals, striae obsolete; elytral surface, except for raised areas closely, irregularly punctate. Mesosternum between middle coxae slightly convex, anterior edge at midline obtusely angulate; surface with widely spaced, moderate sized punctures, each puncture with long seta. Fore tibia with five teeth on outer margin, basal teeth rounded and occasionally with vague, feebly arcuate swelling indicating basal sixth tooth. Genital capsule with elongate, acutely rounded, feebly reflexed, setose apex. Genitalia as in figs. 16, 17.

FEMALES. Length 9.2 to 12.5 mm, greatest width 5.7 to 7.0 mm. Differing only slightly from males; generally with posterior clypeal and inner pronotal carinae slightly less developed, lower; punctures on vertex and in concavity more pronounced; pygidium more convex.

MATERIAL EXAMINED: 17 males, 10 females.

ARGENTINA - Buenos Aires: Haedo. Carcarañá. Chaco de Santiago del Estero: Río Salado near Dilcano. Córdoba: La Falda, XII. Misiones: San Pedro, XI. Pampas. Sante Fé. Tucumán.

[BOLIVIA] - Santa Cruz: Pto. Alegre.

BRAZIL - Goiás: Rio Verde. Santa Catharina: Nova Teutônia, 27° 11'S, 52°23'W, I, II, III, IV, IX, XI, XII.

URUGUAY - Tacuarembó: Puntas de Laureles, XII.

Specimens are in: Brussels, Dresden, London, New York, Paris, San Francisco, São Paulo, Tucumán, Washington, Howden, Ratcliffe.

REMARKS. The species was originally described from Buenos Aires, but most of the specimens seen from Argentina come from Santiago del Estero. The majority of specimens from this area have the pronotum testaceous and the elytra with three or four distinctly raised intervals with the surface coarsely punctate between. However, totally green specimens also have been seen from the same localities as those with a testaceous thorax and all variations of clypeal and pronotal differences were noted in different combinations. All specimens seen from Uruguay and Brazil are entirely green and I originally considered them to be distinct. However, the male genitalia show no consistent differences and specimens in one population overlap in characters with those from different areas. Hence, I consider all of the forms as belonging to a single species, flavithorax.

In his original description, Arribalzaga (1878) mentions that the specimen he described was collected flying on a hot day at noon. This may

be typical behavior for the green or bicolored Neoathyreus, since similarly colored specimens in the other tribes of Geotrupinae (where all brown specimens are crepuscular or nocturnal) also fly during the day. I have observed this daytime activity in Australia in both Stenaspidius and Gilletinus and in South Africa in Parathyreus.

4. Neoathyreus viridis (Boucomont)

Figures 18-20, Map 1

Athyreus viridis Boucomont, 1902a, 185; 1902b, p. 584.

TYPE. Male, labeled "Athyreus viridis B. type; Jatahy, Prov. Goyas, Brésil; typus [red label]; Museum Paris 1938 Coll. A. Boucomont"; in Paris (MHNP).

MALES. Length 8.2 to 9.7 mm, greatest width 6.5 to 7.8 mm. Dorsally greenish brown to bright green. Clypeus with both oblique and posterior carinae strongly developed; median tubercle small, approximately equal in height or lower than lateral tubercles. Vertex flat, coarsely granular. Pronotum (Fig. 18) with small fossa on each side behind eye contiguous with and slightly interrupting anterior marginal bead, fossa approximately three times width of adjacent bead; anterior margin at midline with small conical tubercle. Pronotum with inner arcuate carina on each side flared outwardly anteriorly, anterior apex directed toward lateral margin, carina branched near anterior end, lateral branch of inner carina extending to lateral margin just anterior to fovea and fusing with marginal bead. Concavity between inner carinae shallow, elongate, wider anteriorly, surface mostly punctate-granulate. Outer pronotal carina strongly developed in posterior two-thirds, anterior end obsolete in places, terminating just posterior to lateral fovea; carina positioned almost evenly between inner carina and pronotal margin at and anterior to posterior pronotal angle; pronotal marginal bead of lateral margin unbroken. Each elytron with five, occasionally six, striae between suture and umbone; intervals feebly convex; sides of intervals and striae closely, irregularly punctate and finely setose, surfaces smooth between punctures, shining. Mesosternum between middle coxae very slightly convex, anterior edge sharply, obtusely angulate at midline; surface with scattered minute puncture, each puncture with long, fine, whitish seta. Fore tibia with four teeth on outer margin. Genital capsule with elongate, narrow apex. Genitalia as in figs. 19, 20.

FEMALES. Length 8.1 to 10.0 mm, greatest width 6.5 to 7.9 mm. Differing only slightly from males as follows: clypeal tubercles very slightly reduced in size, particularly median tubercle; pygidium more convex, apex more broadly arcuate.

MATERIAL EXAMINED: 6 males, 8 females.

BRAZIL - Goiás: Jataí (= Jatahy); Rio Verde; Suçuapara; Vianópolis, III.

Specimens are in: Berlin, Dresden, Paris, São Paulo, Howden.

REMARKS. While it is possible that black or brown forms of viridis exist (since black forms are found in other species that are usually green), none have been seen. Thus the combination of the green color and low, strongly developed arcuate or non-angulate inner and outer pronotal carinae (Fig. 18) is sufficient to separate viridis from all other species in the genus. While there are several other green species of Neoathyreus, these have upwardly angulate inner pronotal carinae and are not sibling species of

viridis. Possibly the closest relative of viridis is corinthius.

5. Neoathyreus anfractus n. sp.

Figure 21, Map 1

HOLOTYPE. Female, length 10.8 mm, greatest width 6.4 mm. Dorsally dark reddish brown with sides of pronotum tan, transition to tan gradual, not abrupt. Clypeus with both oblique and posterior carinae moderately developed, carinae thin; median tubercle with sharply rounded, narrow apex; anterior face of tubercle arising from anterior clypeal edge, face slightly slanted posteriorly; lateral tubercle on each side small, situated above posterior base of mandible. Vertex flat to unevenly, feebly convex; surface granulate-punctate, each small puncture at base of granule with long, erect, fine seta. Pronotum (Fig. 21) with moderate sized fossa on each side contiguous with anterior marginal bead behind eye, fossa two to three times width of adjacent bead; anterior pronotal margin between fossae moderately elevated to midline, midline with small conical tubercle with apex 0.1 to 0.2 mm posterior to marginal bead; anterior base of tubercle with poorly defined junction with posterior edge of marginal bead. Inner pronotal carina on each side arising 1.1 mm behind fossa, carina 0.3 to 0.4 mm wide, uniform in height, sinuous with anterior end strongly divergent from opposite carina; posterior to the divergent portions, each carina inwardly arcuate to about 1.5 mm from opposite carina, then feebly curved laterally, then feebly convergent, posterior ends of both inner carinae separated by approximately 1.0 mm, each terminating 0.5 mm before posterior pronotal margin. Pronotal concavity with deepest portion Y-shaped, each arm of "Y" deepest on each side midway between anterior median marginal tubercle and anterior end of inner carina, concavity then extending posteriorly to transverse punctate area between carina about 1.0 to 1.3 mm before posterior margin; surface of concavity granulate anteriorly, then gradually less so to nearly smooth posterior edge; all pronotal granules each with puncture at base with long, erect seta. Outer pronotal carina on each side divided in two portions; anterior part fusing with lateral marginal bead just anterior to lateral fovea, carina thin, about 1.5 mm long, ending just above lateral fovea; posterior portion of carina similar in width to inner carina, about 1.5 mm long, very slightly closer to lateral margin anterior to posterior angle than to adjacent inner carina. Lateral pronotal margin below fovea, broadly, shallowly, inwardly arcuate; marginal bead complete, not broken. Elytron with five or six moderately impressed striae, elytral surface coarsely punctate, punctures not limited to striae; each puncture with moderately long, semi-erect tan seta; surface between punctures smooth, shining. Metasternum between middle coxae feebly convex, anterior edge obtusely angled, apex of angle at midline with small tubercle; surface of metasternum with scattered small punctures, each with long, semi-erect seta. Fore tibia with four teeth on outer margin.

MALE. Unknown.

TYPE MATERIAL: Holotype, female, [Brazil], Pr. de Bahia, S. Antonio da Barra, Gounelle 11.XII.88 (Paris).

REMARKS. As discussed under latidorsalis, anfractus belongs to a small group of three closely related species, the third species being purpureipennis. Neoathyreus anfractus can be distinguished from either of these by the oddly shaped, sinuate, inner pronotal carina. The species is

probably most closely related to latidorsalis.

6. Neoathyreus latidorsalis n. sp.

Figures 22-25, Map 1

HOLOTYPE. Male, length 11.0 mm, greatest width 6.5 mm. Dorsally reddish-brown. Clypeus with both oblique and posterior carinae strongly developed; median tubercle in centre of clypeus only moderately elevated, apex worn; lateral tubercle on each side above base of mandible feebly developed. Vertex between eyes flat to feebly convex; surface minutely setose, coarsely granulate between eyes, punctate posteriorly between low carina on each side. Pronotum (Figs. 22, 23) with small fossa on each side behind eye contiguous with anterior marginal bead, fossa only slightly wider than adjacent bead; anterior pronotal margin between fossae gradually elevated to midline, small tubercle present at midline, base of tubercle merging with posterior edge of marginal bead. Inner pronotal carina unusually wide, 0.5 mm or more; anterior end arising approximately 0.8 mm behind fossa, carina strongly convergent with opposite carina, approaching within 0.2 mm of midline at about anterior third, then parallel with midline and opposite carina to posterior termination 0.6 mm before posterior pronotal margin; concavity between inner carinae very shallow, represented mainly by elongate, granulate-punctate depression along midline; granulate-punctate surfaces of pronotum with minute setae. Outer pronotal carina on each side divided into two portions, anterior section with lateral end fused with lateral marginal bead; carina extending inward as thin raised ridge immediately anterior to lateral fovea, length of carina 1.5 mm to 1.6 mm; posterior position of carina wide, similar to inner carina in appearance, about 1.5 mm long, wider posteriorly, positioned midway between lateral margin anterior to posterior angle and inner carina; lateral pronotal fovea shallow, margin below broadly, shallowly inwardly arcuate, marginal bead complete, not reduced. Elytron with four or five feebly impressed striae, surface of disc closely, coarsely punctate, each puncture with short, fine, black seta; surface between punctures smooth, shining. Metasternum between middle coxae convex, anterior edge obtusely angulate, apex of angulation with short, low ridge or tubercle; surface of metasternum with widely scattered minute punctures, some punctures with moderately elongate, fine setae. Fore tibia with four teeth on outer margin. Genitalia as in figs. 24, 25.

ALLOTYPE. Female, length 8.7 mm, greatest width 5.4 mm. Dorsally tan. Similar to holotype except as follows: dorsal setae larger, more conspicuous; both median and lateral clypeal tubercles reduced in size and height, a function of smaller overall size; pygidium more convex, apex more rounded.

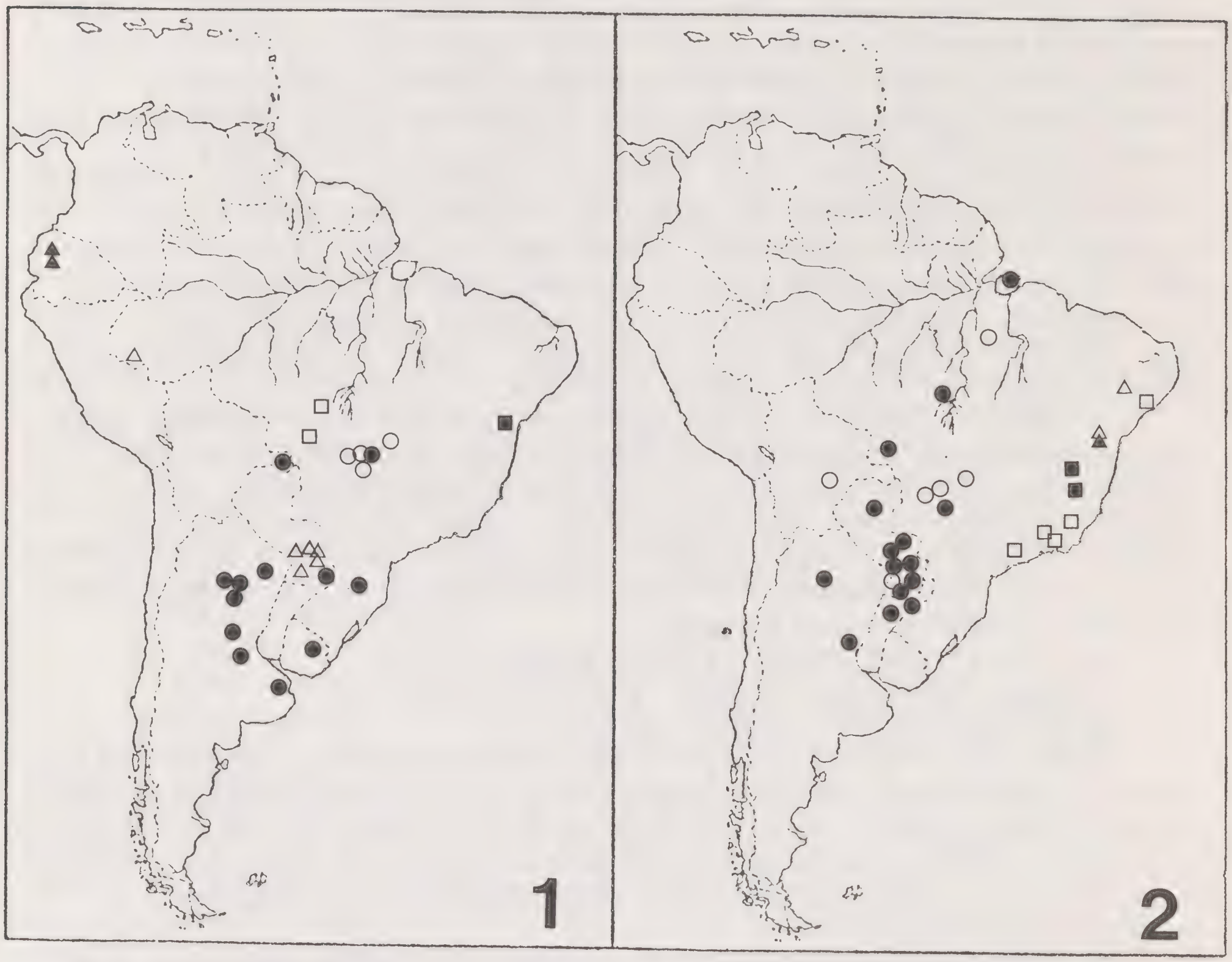
TYPE MATERIAL: Holotype, male, Brasília, Cuyabá (Berlin). Allotype, female, same data as holotype (Berlin).

PARATYPE: 1 male.

BRAZIL - Mato Grosso: 12°51'S, 51°47'W, 13.II.1968. O.W. Richards (London).

REMARKS. Seven relatively small species have an outer pronotal carina that joins the lateral margin. Four of these species have at least the elytra green or black. Three species anfractus, purpureipennis and latidorsalis are mostly tan, reddish-brown or brown with a purplish hue.

The two brown species are both related to latidorsalis, and since the male of anfractus is unknown it is difficult to ascertain which is most closely related. The three species certainly represent a complex of closely related forms that are best separated by the characters given in the key.



▲= 1. glaseri n. sp.
△= 2. arribalzagai (Martínez)
●= 3. flavithorax (Arribalzaga)
○= 4. viridis (Boucomont)
■= 5. anfractus n. sp.
□= 6. latidorsalis n. sp.

▲= 7. purpureipennis (Westwood)
△= 8. anthracinus (Klug)
■= 9. cuspinotatus n. sp.
□=10. bidentatus (Macleay)
●=11. sexdentatus (Laporte)
○=12. centromaculatus (Felsche)

7. Neoathyreus purpureipennis (Westwood)

Figures 26-28, Map 2

Athyreus purpureipennis Westwood, 1848, p. 387; 1851, p. 463.

TYPE. Male, labeled "Athyreus purpureipennis Westw.; 4960" and with circular "Type" label, in London.

MALE (Holotype). Length 13.3 mm, greatest width 7.5 mm. Dorsally brown with purple tinge. Clypeus trituberculate; median tubercle slightly higher, anterior in position; oblique clypeal carina to median tubercle pronounced; posterior transverse carina distinctly elevated. Vertex between eyes flat or nearly so, evenly granulate. Pronotum (Fig. 26) with

fovea on each side behind eye deep, diameter about three times width of marginal bead; anterior pronotal margin medially with well-developed, contiguous, almost conical tubercle; posterior to tubercle midline impressed. Pronotum with inner carina on each side extremely broad, gradually rounded transversely, smooth area of carina extending to impressed midline in median third; inner carina with lateral branch extending to lateral pronotal margin just anterior to lateral fovea. Outer carina large, well-developed, parallel to outer edge of inner carina, separated from inner carina by distance equal to own width or less; short, separate, portion of outer carina present just posterior to very shallow lateral fovea, carina near fovea approximately 0.5 mm in length. Pronotum with lateral margin not indented or modified, marginal bead complete. Each elytron with at least five moderately to well-defined striae, striae punctate-setose; intervals somewhat irregular, smooth and shining. Metasternum between middle coxae flat, sparsely punctate-setose; anteriorly sharply, obtusely angulate. Fore tibia with four distinct teeth on outer margin, a vague indentation present basally behind fourth tooth. Genitalia as in figs. 27, 28.

FEMALE. Length 11.5 mm, greatest width 6.6 mm. Dorsally black with pronotum with lateral third or fourth dark brown. Similar to male except in the following respects: vertex less strongly granulate, more strongly punctate (worn); pronotum with indentation of midline obsolete; lateral branch of inner carina briefly interrupted at inner end; small segment of outer carina posterior to lateral fovea absent; dorsal setae reduced in number, probably due to abrasion.

MATERIAL EXAMINED: 1 male, 1 female.

BRAZIL - Holotype, no data. Bahia, IV.1948.

Specimens are in: London, Howden.

REMARKS. The fore tibia with four teeth on the outer margin and the extremely wide inner carina of the pronotum with its lateral branch extending to the lateral pronotal margin distinguish this species as defined here. It is possible that the much smaller female with its slight differences in the pronotal carinae represents a closely related species but, at present, I consider this unlikely.

Neoathyreus purpureipennis is related to the viridis-corinthius group which has a lateral extension, broken or complete, of the inner pronotal carina extending to the lateral pronotal margin. The wider inner carina and possibly the purplish tinge of the male elytra will separate purpureipennis from other species in the group.

8. Neoathyreus anthracinus (Klug)

Figures 29-31, Map 2

Athyreus anthracinus Klug, 1843, p. 33.

TYPE. Male (not dissected), labeled "anthracinus Klug, Bahia, Gom." [green label]; "25640; Typus" [red label]; in Berlin.

MALES. Length 9.2 to 10.0 mm, greatest width 5.8 to 6.3 mm. Dorsally black. Clypeus with oblique and transverse posterior carina strongly developed; median tubercle pronounced, anterior in position to and higher than poorly developed lateral tubercle on each side; lateral tubercle often appearing only as angulate junction of posterior and marginal carinae. Vertex between eyes feebly convex, surface granulate, with some scattered, fine, setose punctures; small area of vertex posteriorly on midline smooth,

impunctate. Pronotum (Fig. 29) with relatively large, deep fossa on each side contiguous with anterior marginal bead behind eye, fossa five or more times width of adjacent bead; pronotal margin between fossae with small, rounded tubercle at midline. Pronotum with wide, rounded inner carina, carina most widely separated from opposite carina at anterior end, carina then gradually converging with opposite one posteriorly, each carina very slightly inwardly arcuate near middle; width of carina sometimes slightly reduced near middle. Pronotal concavity Y-shaped, each arm extended to posterior edge of fossa on each side, concavity shallow, mostly smooth, a few scattered punctures on "arms" near fossae, row of punctures present along inner edge of each inner carina; inner carina with lateral branch extending to and merging with lateral margin just anterior to lateral fovea; connection of lateral branch of carina with inner carina vague to obsolete. Outer posterior carina approximately 2.0 mm in length, positioned midway between inner carina and inwardly arcuate margin of posterior pronotal angle; lateral pronotal margin below small fovea not abruptly indented, marginal bead complete. Elytron with five distinct and one or two indistinct striae between suture and umbone, distinct striae indicated by slightly irregular rows of setose punctures; slightly raised intervals largely impunctate, smooth and shining. Metasternum between middle coxae feebly convex, anterior edge at midline obtusely angulate, surface with moderate sized, shallow punctures mostly separated by one to two diameters. Fore tibia with four teeth on outer margin. Genitalia as in figs. 30, 31.

FEMALE. None seen.

MATERIAL EXAMINED: 5 males (including type).

BRAZIL - Alagoas: São Miguel dos Campos, IV. Bahia.

Specimens are in: Berlin, London, Oxford, Pittsburgh, Howden.

REMARKS. The five males seen show little variation and I suspect females will have characters similar to small males. Neoathyreus anthracinus can best be identified by the fairly wide, largely impunctate pronotal concavity; the relatively uniformly wide, slightly arcuate inner carina; the distinct branch of the inner carina extending to the lateral margin; the pronounced median tubercle of the clypeus (males only ?) and, in non-teneral specimens, the black dorsal color. The species is probably most closely related to purpureipennis (Westwood).

9. Neoathyreus cuspinotatus n. sp.

Figures 32-34, Map 2

HOLOTYPE. Male, length 12.5 mm, greatest width 7.3 mm. Dorsally light reddish brown. Clypeus with oblique and posterior transverse carinae present, not strongly developed; median tubercle pronounced, anterior base of tubercle arising from anterior clypeal margin, face slanted posteriorly to apex of tubercle; posterior carina on each side depressed, rising slightly to small, poorly developed lateral tubercle. Vertex with median half between eyes distinctly concave; surface coarsely granulate, each granule with long tan seta at base. Pronotum (Fig. 32) with deep fossa on each side contiguous with anterior marginal bead behind eye, fossa one and one-half to two times as wide as adjacent bead; pronotal margin arcuately elevated to midline, midline starting at and posterior to margin with large, laterally compressed tubercle (see Fig. 32); tubercle approximately 1.0 mm high. Inner pronotal carina on each side arising about 1.0 mm behind fossa,

gradually elevated to slightly inflexed obtuse angle near middle, then abruptly depressed, briefly flared to inwardly arcuate posterior, posterior edge of carina approximately 0.3 to 0.4 mm from posterior pronotal margin, area near midline wider; concavity deepest between angulations, surface closely granulate-rugose and punctate, except smooth in posterior fourth behind line of angles. Outer pronotal carina obsolete, vaguely indicated by row of several larger, shining granules. Pronotum with lateral fovea shallow, small with vague secondary depression below; pronotal margin below fovea not indented, bead complete. Elytron with one or two feebly elevated, poorly defined intervals; surface of elytron closely, coarsely, irregularly punctate, each puncture with semi-erect brownish seta. Metasternum between middle coxae almost flat, anterior edge obliquely angulate, (midline obscured by glue), surface feebly punctate, each puncture with long seta. Fore tibia with five teeth on outer margin. Genitalia as in figs. 33, 34.

ALLOTYPE. Female, length 12.6 mm, greatest width 7.8 mm. Dorsally dark brown with sides of pronotum light brown. Similar to holotype except as follows: oblique clypeal carina more strongly developed; median clypeal tubercle smaller, lower; midline of pronotum anteriorly with compressed tubercle thicker, anterior edge more uniformly curved posteriorly; smooth area of posterior end of pronotal concavity extending further anteriorly and slightly wider; outer pronotal carina short, distinct between inner carina and inwardly arcuate pronotal margin anterior to posterior angle; pygidium more convex, apex more broadly rounded.

TYPE MATERIAL: Holotype, male, Brazil, Sabará-Bello Horizonte, Rio das Velhao, A.G.N. Chalmers, B.M. 1932-11 (London). Allotype, female, Brazil, Minas Gerais, Aguas Vermelhas, XII.1983, M. Alverenga (Pittsburgh).

PARATYPES: 3 males; 2, same data as allotype.

BRAZIL - 1, no other data.

Paratypes are in: Brussels, Pittsburgh, Howden.

REMARKS. This species is very close to catharinae, differing primarily in having a pronounced, laterally compressed, anterior pronotal tubercle and a differently shaped inner pronotal carina (Fig. 32). I have examined two other specimens other than the paratypes that I would refer to cuspinotatus but have excluded as paratypes because of their atypical inner pronotal carina. One specimen, a male labeled "Rio Jan. Fry" (London) is approximately the same size as the holotype but has the anterior median tubercle low, longer than high and with a sharp angle at the posterior end. The other specimen, a female, is labeled "S. America, Columbien, Cauca" (Dresden); I rather doubt the data. Both the male and female have the inner pronotal carina of approximately the same length, development and shape before and behind the small, inwardly directed obtuse angle near the middle of the carina. The shape of the carina differs from both cuspinotatus and catharinae, but is closer to the former. Either cuspinotatus exhibits considerable variation or at least two species are present. The atypical form will key to cuspinotatus in my key. Obviously more material is needed to establish the limits of variation of the various forms in this complex.

10. Neoathyreus bidentatus (Macleay)

Figures 35-37, Map 2

Athyreus bidentatus Macleay, 1819, p. 124; Westwood, 1851, p. 458.
Athyreus fossulatus Westwood, 1851, p. 464. NEW SYNONYMY.

TYPE. bidentatus Macleay, not seen, location uncertain, possibly in Macleay collection, Sydney.

TYPE. fossulatus Westwood. Male (? not dissected) labeled: "fossulatus Westw.; so named in Reichés collection, C.W.; Pernambuco; 30; 67.45;" and with circular "TYPE" label, in London.

MALES. Length 9.6 to 10.8 mm, greatest width 5.9 to 6.6 mm. Dorsally black with conspicuous brown setae. Clypeus trituberculate, median tubercle distinctly larger and higher than lateral tubercles; median tubercle anterior in position, anterior face rising vertically above anterior clypeal edge (large males) or slanted slightly posteriorly (smaller males); both oblique and posterior transverse clypeal carinae well developed. Vertex flat, closely granular. Pronotum (Fig. 35) on each side behind eye with small, deep fossa, diameter of fossa approximately equal to width of adjacent anterior marginal bead; anterior pronotal margin with very small tubercle or obscure swelling at midline; pronotum abruptly concave posterior to margin behind vertex, concavity elongate, deepest and smooth along midline to posterior termination marked by transverse, smooth area. Pronotal concavity delimited on each side by relatively thick carina; carina (large specimen) inwardly, obtusely rounded (not sharp angle) near midpoint of length, then feebly convergent with opposite carina to rounded posterior end just posterior to transverse smooth area; in small males carina lower, only feebly sinuate near middle. Outer pronotal carina on each side absent in most specimens, one small male (from Esprito Santo) has carina indicated by irregular line apparently formed by fusion of granules into irregular, smooth feebly raised posteriorly positioned carina. Pronotum laterally with shallow fovea, pronotal margin below not indented, marginal bead complete. Elytron with three to five feebly impressed striae, entire surface closely punctate-setose, in part rugose, raised intervals slightly less roughened; surface not mostly shining. Metasternum between middle coxae feebly convex, anterior edge obtusely angled, surface with widely separated small setose punctures; metasternal midline with faint depression or ridge. Fore tibia with four teeth on outer margin. Genitalia as in figs. 36, 37.

FEMALES. Length 9.2 to 10.6 mm, greatest width 5.4 to 6.7 mm. Similar to males except in the following respects: clypeus with median tubercle less pronounced; inner pronotal carina slightly reduced in development (large specimens) to uniform in height, straight, convergent posteriorly and with feeble, uniform, very shallow concavity lacking transverse smooth area; elytral striae in one specimen with only two striae vaguely indicated.

MATERIAL EXAMINED: 11 males, 8 females.

BRAZIL - 3, no other data; Espírito Santo: Pernambuco: Rio de Janeiro: Nova Friburgo, I; Rio de Janeiro; Petrópolis, XII. São Paulo.

Specimens are in: Brussels, Dresden, Geneva, London, Munich, Paris, Pittsburgh, São Paulo, Washington, Howden.

REMARKS. The synonomy proposed above is based primarily on Macleay's (1819) meager description which includes the following useful points: pronotum with two oblique angles (presumably refers to inner carinae), color black, fore tibia with four teeth (in observations following descriptions); and locality Brazil. The only Brazilian species seen with the

above characters is the one described by Macleay and subsequently by Westwood in 1851 under the name fossulatus. Since the above characters, if the locality is included, appear to be unique, I feel that the proposed synonomy is justified. Unfortunately the location of Macleay's type of bidentatus (and other Athyreini) remains in doubt. I have briefly examined the extensive Macleay collection in Sydney, but was unable to find any Athyreini.

There are several species of relatively small, black Neoathyreus from Brazil, but the following combination of characters will distinguish bidentatus: color black; clypeus with median tubercle near anterior edge and frequently twice the size of lateral tubercles; each inner pronotal carina with rounded, oblique, inwardly directed angulation or sinuation near middle, carina not abruptly elevated; outer pronotal carina usually absent, rarely poorly, irregularly defined; elytral surface rough, not shining; and fore tibia with four teeth on outer margin.

The shape of the inner pronotal carinae and of the pronotal concavity varies due to allometric growth. Very small specimens of both sexes lack the distinct angulation of the inner carina and in some the concavity is very shallow and completely granular. In these cases the complete marginal bead of the lateral pronotal margin and lack of or feeble development of the outer pronotal carina will usually identify the species. The male genitalia are also diagnostic.

The most similar species to bidentatus is probably violaceus (Klug) which differs from bidentatus by having: five teeth on outer margin, distinct outer carina, non-angulate inner carina, and shining elytral intervals.

11. Neoathyreus sexdentatus (Laporte)

Figures 1, 38-40, Map 2

Athyreus sexdentatus Laporte, 1840, p. 103; Westwood, 1851, p. 464.

TYPE. Female labeled: "Athyreus sexdentatus De Laporte, anim. art. v 2, p. 103, No. 9. Boards du Paraguay" all on single green label, in Oxford.

MALES. Length 8.5 to 12.1 mm, greatest width 5.2 to 7.1 mm. Dorsally uniformly tan to brown. Clypeus trituberculate, median tubercle pronounced, two to three times height of small lateral tubercle on each side and anterior in position, anterior face of tubercle rising vertically above anterior margin of clypeus; oblique carinae strongly developed, extending almost to apex of median tubercle; posterior carina extending between tubercles also strongly developed. Vertex flat to shallowly concave between eyes, surface granular and setose, sometimes less closely granular near midline. Pronotum (Fig. 38) with fossa on each side deep, diameter three to four times width of adjacent anterior marginal bead; anterior pronotal margin with small tubercle at midline; pronotum medially, posterior to anterior margin concave between inner carinae, concavity granulate except along midline. Inner pronotal carina on each side sharply, obtusely, inwardly angulate near posterior third, carina lower and inwardly arcuate posterior to angle; posterior edge of concavity frequently smooth between inner carinae; smooth area lacking in small specimens. Outer pronotal carina lacking. Lateral pronotal fovea feebly to moderately impressed, near circular; lateral pronotal margin not indented below fovea, marginal bead complete, not interrupted either medially or near posterior angle. Elytron with striae obsolete, elytral surface setose-punctate, most punctures with small anterior granule. Metasternum between middle coxae moderately

convex, midline only occasionally feebly impressed or delimited by dark line, surface punctate-setose; anterior margin rounded, distinct median angle lacking. Fore tibia frequently with six teeth on outer margin (type has six teeth), occasionally small, basal, fifth and six tooth fused giving appearance of five teeth on outer margin. Genitalia as in figs. 39, 40.

FEMALES. Length 8.4 to 12.3 mm, greatest width 5.2 to 7.4 mm. Very similar to males differing as follows: median clypeal tubercle frequently reduced in height, with anterior face slanted posteriorly, not vertical above anterior clypeal margin; inner pronotal carina(e) in very small specimens sinuate medially, distinct obtuse angle lacking.

MATERIAL EXAMINED: 80 males, 99 females.

ARGENTINA - Corrientes: Misiones: Apóstoles, XI; Gran Chaco; Río Salado; Río las Garzas [sic], Ocampo; Santa Fé: Río san Javier, Estancia la Noria, I, XII.

BRAZIL - Espírito Santo: Guyabá; Mato Grosso: Barra do Tapirapé, XI; Pôrto Velho; Rio Tapirapé, III; St. Domingos, X; Três Lagoas, IV; Pará: Soure Marajó.

PARAGUAY: Ascunción; Chaco, Río Confuso; Horqueta, III; Itapúa, Salto Tembey, X; Sa. Trinidad, XII; San Bernardino; San Pedro, Carumby, III; Sapucay, II; Villarrica.

Specimens are in: Berlin, Brussels, Chicago, Geneva, Leiden, London, Munich, New York, Paris, Pittsburgh, San Francisco, São Paulo, Tucumán, Washington, Arnaud, Glaser, Howden.

REMARKS. There has been some confusion over the application of the name sexdentatus, perhaps due in part to the variable number of teeth on the fore tibia. However, the species can usually be recognized by the obtusely, inwardly angulate inner pronotal carina on each side of the concavity, by the lack of the outer pronotal carina, by the small median tubercle on the anterior pronotal margin, by the lack of elytral striae and by the distinctive male genitalia. The most closely related species appears to be goyasensis.

12. Neoathyreus centromaculatus (Felsche)

Figures 41-44, Map 2

Athyreus centromaculatus Felsche, 1909, p. 763.

TYPE. Female, labeled "Jatahy, Goyas B.; Coll. C. Felsche, Kauf 20, 1918; centromaculatus Felsche, Goyas" handwritten on folded, red bordered label; "TYPUS"; and with museum label, in Dresden (a second smaller specimen with identical locality label is also in Dresden, but there is no evidence that it was included in Felsche's description).

MALES. Length 5.8 to 8.5 mm, greatest width 3.4 to 5.8 mm. Dorsally greyish-black to black or bicolored with head, central third or more of pronotum, and often bases of elytra black, remainder reddish brown; numerous dorsal setae pale tan to white. Clypeus with both oblique and posterior carinae strongly developed; median tubercle distinct, only slightly higher than lateral tubercle on each side, posterior carina between tubercles downwardly arcuate between tubercles. Vertex flat to very slightly concave between eyes; surface granulate-setose, granulations closer on small specimens. Pronotum (Figs. 41, 42) with small fossa on each side behind eye contiguous with anterior marginal bead, fossa two to three times width of adjacent bead; anterior margin at midline with pronounced conical tubercle situated just posterior to marginal bead and with anterior base

merging with bead. Pronotum with inner carina on each side arising at or behind level of lateral foveae; carina somewhat variable in length, proportunately shorter in larger males, carina moderately to feebly bowed inwardly between ends, carina measuring 0.2 to 0.3 mm in width (wide for size of species), uniformly elevated and sharply delimited from surrounding granulate surface; surface between inner carinae concave for total area between carina, wider anteriorly; surface of concavity granulate with transverse smooth band extending between carinae, position and width of band varying with size, being reduced in width and more posterior in position in small specimens. Outer pronotal carina absent; lateral fovea on each side very small, shallow; pronotal margin below fovea not indented, bead not interrupted. Elytron with few faint depressions at base, no striae or intervals extending onto disc; elytral surface closely, doarsely punctate, surface between irregular, shining; most punctures each with semi erect seta. Metasternum between middle coxae flat to feebly convex, midline faintly indicated or not, anterior edge at midline obtusely angulate; surface with widely separated coarse punctures, each with long whitish seta. Fore tibia with six teeth on outer margin, basal tooth often minute (probably not evident in abraded specimens). Genitalia as in figs. 43, 44.

FEMALES. Length 5.8 to 7.1 mm, greatest width 3.7 to 4.6 mm. In color, punctures, and shape of pronotal carinae females as variable as males; differing from males as follows: clypeus with median tubercle slightly reduced in height and with anterior face more slanted, tubercle more posterior in position; lateral tubercles not differing from those of males. Pygidium more convex, apex more rounded.

MATERIAL EXAMINED: 6 males, 3 females.

BOLIVIA - Santa Cruz: Buena Vista.

BRAZIL - Goiás: Jataí (= Jatahy); Mineiros; Rio Verde; Trinidade; Pará.

PARAGUAY - San Bernardino.

Specimens are in: Berlin, Paris, Pittsburgh, Howden.

REMARKS. As defined here centromaculatus may represent a complex of closely related forms. The relatively few specimens I have seen vary considerably, not only in size and color, but nearly every specimen seen has slightly differently shaped inner pronotal carinae. However the variation noted cannot be easily correlated with different localities or habitats. The few specimens seen from Jatai (type locality) varied from bicolored to entirely black; the largest and smallest specimens were also from that locality and the greatest pronotal variation also occurred there. Before naming any of the different "morphs" I would want to have a good series bearing accurate data from a number of localities.

The species can be recognized by its relatively small size, black or sharply brown and black dorsal color, fore tibia with six teeth, and its pronotal characters (Figs. 41, 42).

13. Neoathyreus peckorum n. sp.

Figures 45-47, Map 3

HOLOTYPE. Male, length 9.6 mm, greatest width 6.6 mm. Dorsally reddish brown. Clypeus with oblique and posterior carinae complete, moderately developed; oblique carina on each side fusing with opposite below anterior apex of median tubercle; median tubercle approximately twice height

of lateral tubercle on each side; apex of median tubercle round, somewhat triangular in dorsal view; lateral tubercles feebly developed. Vertex feebly concave between eyes, surface finely granulate-rugose, most granules each with erect tan seta at base. Pronotum (Fig. 45) with relatively deep fossa on each side contiguous with anterior marginal bead behind eye; fossa three to four times width of adjacent bead; anterior pronotal margin between fossae elevated to midline, midline with large, erect, acutely pointed tubercle, anterior base of tubercle merging with anterior marginal bead. Inner pronotal carinae complex, carina on each side arising approximately 0.4 mm behind fossa, carina upwardly arcuate at middle (in lateral view), parallel with opposite carina (in dorsal view) to posterior third, then abruptly inwardly arcuate to sinuate, inner margin of carina bending anteriorly and merging with opposite carina to form acute, anteriorly directed tubercle, midline with low ridge for 1.0 mm anterior and below tubercle; posterior portion of inner carina on each side with posterior extension (as typical for many Neoathyreus) terminating about 0.4 mm from midline and 0.6 mm from posterior pronotal margin. Pronotal concavity slightly elongate, midline impressed anteriorly behind anterior acute tubercle; surface of concavity granulate-punctate, gradually with fewer, more widely spaced granules, posterior declivous portion smooth. Outer pronotal carina on each side thick, feebly arcuate, approximately 1.0 mm long, positioned midway between posterior lateral pronotal margin and inner carina. Pronotum with lateral fovea obsolete, area very feebly concave (unusual for genus), pronotal margin below not indented, marginal bead complete; median pronotal angle broadly rounded. Elytron with striae obsolete, surface closely, coarsely punctate, each puncture with semi-erect seta; surface between punctures shining. Metasternum between middle coxae feebly convex, midline feebly, narrowly indented, anterior edge at midline broadly, obtusely angulate, sharp projection lacking; surface of metasternum shallowly punctate, each puncture with long, semi-erect seta. Fore tibia with six teeth on outer margin. Genitalia as in figs. 46, 47.

FEMALE. Unknown.

TYPE MATERIAL: Holotype, male, Colombia, 33 km E. Villavicencio, 2-4.III.1972, S. & J. Peck, in forest (Howden).

REMARKS. This species has relatively unique pronotal characters, the acute tubercle at the middle of the anterior margin and the acute tubercle at the posterior median end of the concavity are sufficient to recognize the species. The species probably belongs to the lanuginous complex.

The species is named in honour of my colleagues, Stewart and Jarmila Peck, both of whom have contributed greatly to this study and have, over the years, turned up many new and interesting Scarabaeidae.

14. Neoathyreus corniculatus (Felsche)

Figures 48-50, Map 3

Athyreus corniculatus Felsche, 1909, p. 762.

TYPE. Female, labeled: "Venezuela, Mérida; Coll. C. Felsche, Kauf 20, 1918; corniculatus Felsche, Venezuela [handwritten on folded, red bordered label]; TYPUS;" and with museum label, in Dresden.

MALES. Length 12.6 to 13.8 mm, greatest width 7.3 to 8.0 mm. Dorsally brown to dark brown with sides of pronotum frequently lighter in color. Clypeus with both oblique and posterior carinae present, posterior carina on each side of median tubercle depressed and extending obliquely posteriorly to pronounced lateral tubercle; median tubercle distinctly anterior to lateral tubercles, anterior face vertical to slanted, slanted posteriorly above clypeal margin. Vertex between eyes with concave area, surface of vertex closely granulate, median depression frequently only finely, sparsely granulate. Pronotum (Fig. 48) with small fossa on each side behind eye adjacent to anterior marginal bead, diameter of fossa three or four times width of adjacent marginal bead; pronotal bead at midline very feebly thickened, not widened and elevated (see lobus). Pronotum with inner carina on each side more sharply delimited along outer edge, carina anteriorly arising approximately 1.0 mm posterior to fossa, most distinctly elevated in posterior half, elevated portion evenly, inwardly arcuate to approximately 0.5 mm from midline; upright, slightly laterally compressed knob (Fig. 48) present on midline between lateral carinae approximately 1.5 mm before posterior pronotal margin; concavity between carina broad, sides gradually sloping, surface in anterior half moderately to closely granulate; granules becoming gradually smaller, more widely spaced to a smooth non-granulate, feebly punctate area on either side of knob, the poorly delimited smooth area forming inner portion of inner carinae. Outer pronotal carina on each side absent or feebly indicated by presence of elongate, non-granulate area midway between arcuate posterior pronotal angle and inner carina; lateral fovea small, pronotal margin below feebly indented, marginal bead occasionally briefly interrupted. Elytron with three to five very feebly elevated intervals, surface of elytron closely, irregularly granulate and punctate-setose. Mesosternum between middle coxae feebly convex, anterior margin at midline obtusely angulate; surface slightly alutaceous, with well spaced setose punctures, most punctures with minute, raised granulation at anterior edge. Fore tibia with five or six teeth on outer margin. Genitalia with apex of capsule narrowly rounded, not reflexed, densely setose. Genitalia as in figs. 49, 50.

FEMALES. Length 12.0 to 12.8 mm, greatest width 7.1 to 7.9 mm. Differs only slightly from males: clypeal tubercles smaller, lower; pronotum with flattened, smooth area along inner edge of inner carinae reduced in width (may be more related to size than sex); pygidium more convex, apex more broadly rounded.

MATERIAL EXAMINED: 2 males, 5 females.

VENEZUELA - Carabobo: Borburata, 600m, IV. Caracas. Miranda; Petaguire, V: San Antonio.

Specimens are in: Berlin, Geneva, Maracay, Howden.

REMARKS. It is interesting that the range of corniculatus seems to be limited to northern South America, while its sibling, lobus, occurs in Argentina. The two species are externally very similar, differing primarily in their pronotal characters; however there are subtle differences as well, for example, the mesosternum of lobus has larger, more closely spaced punctures lacking distinct anterior granules that are usually present in corniculatus. Habitat data are lacking for corniculatus but I suspect the habitats are roughly similar to those of lobus.

15. Neoathyreus lobus n. sp.

Figures 51-53, Map 3

HOLOTYPE. Male, length 13.4 mm, greatest width 8.1 mm. Dorsally head and pronotum light brown with sides of pronotum tan, elytra darker brown. Clypeus with both oblique and posterior carina well developed, posterior carina on each side of median tubercle slightly depressed and extending obliquely posteriorly to lateral tubercle; median tubercle distinctly anterior in position to lateral tubercles; all tubercles well developed. Vertex between eyes feebly concave, surface densely granulate. Pronotum (Fig. 51) with minute fossa on each side behind eye adjacent to margin, fossa only slightly larger in diameter than adjacent granules; anterior pronotal marginal bead at midline elevated and expanded into a posteriorly directed obtuse angulation of the posterior edge of bead. Pronotum with inner carina on each side arising about 0.8 mm posterior to fossa, carina nearly straight in anterior half then abruptly, inwardly arcuate and widened in posterior half; outer edge of carina elevated, inner margin less elevated above surface but delimited by sharp, crenulate edge adjacent to closely granulate area of concavity; concavity gradual, posterior midline 1.8 mm before posterior margin with upright, nearly circular knob with base anteriorly and laterally closely granulate-punctate. Outer carina on each side poorly developed, represented by short, feebly elevated ridge above inwardly arcuate posterior pronotal angle, ridge closer to inner carina than to margin; lateral pronotal margin feebly indented below small lateral fovea, marginal bead complete, not reduced or broken. Elytron with one or two very feebly depressed striae near suture, surface almost uniformly, roughly punctate, most punctures each with erect, posteriorly slanted tan seta. Mesosternum between middle coxae slightly convex, midline faintly impressed, anterior edge at midline obtusely angulate; surface with moderate sized punctures separated by approximately two diameters, most punctures each with long tan seta. Genital capsule with apex broadly rounded, setose. Genitalia as in figs. 52, 53; slender cylindrical projection on each side nearly twice as long as in corniculatus.

ALLOTYPE. Female, length 13.1 mm, greatest width 7.3 mm. Similar to holotype except: darker with head, pronotum, and elytra brown, sides of pronotum light reddish-brown; pygidium more convex, apex more broadly rounded.

TYPE MATERIAL: Holotype, male, Argentina, Catamarca, La Viña, 22-25.II.1979, R. Golbach (Tucumán). Allotype, female, same data as holotype (Tucumán).

PARATYPES: 10 males, 22 females.

ARGENTINA - 5, same data as holotype. 1, no other data, A.E. Bottche. Northern Argentina, 1907-205BM. Jujuy: 6 km W. Yuto, INTA, 13-14.II.1982, H. & A. Howden. Tucumán: 450 m, 21.I.1904, 3.V.1926, XI-XII.1944, R. Golbach; Farallon Blanco, 7-8.II.1961, R. Golbach; Horco Molle, 15.I.1961, L. Stange, 18.I.1966, H. & M. Townes; Tafí Dist., X. 1945; Tafí Viejo, X.1945, A. Brizuela; Tucumán City, I.1952, P. Wygodzinsky; Villa Nougues, III.1939, I.1957, F. Monros, 13.I.1966, L. Stange, 13-17.I.1966, H. & M. Townes. Salta: Prov. 1905, Steinbach; Cerrillos, INTA, 9.II.1982, H. & A. Howden; 20 km N. La Caldera, El Ucumar, 780 m, 31.I.1982, H. & A. Howden; Viñaco, 15 km S. El Carril, 12.II.1982, H. & A. Howden.

BOLIVIA - San Antonio.

Paratypes are in: Berlin, London, Paris, Tucumán, Washington, Howden, Martínez.

REMARKS. Size ranges from 11.4 to 13.7 mm in length and from 6.7 to 8.9 mm in greatest width. The majority of specimens resemble the allotype in coloration, but in major characters there are no noteworthy variations. Most of the specimens personally collected were taken at light in areas of dense thorn scrub or at Yuto in Jujuy, near a patch of broadleaf evergreen forest. One specimen from Cerrillos in Salta Prov. was caught in a flight interception trap set in long grass in a stand of Prosopis sp. (mesquite trees). Specimens taken at light flew in shortly after sunset. The species is closely related to corniculatus from Venezuela; characters separating the two species are given under corniculatus and in the key.

16. Neoathyreus reichii (Westwood)

Figures 54-57, Map 3

Athyreus reichii Westwood, 1851, p. 465.

TYPE. Female (not dissected) labeled: "Athyreus reichii Westw. NOV. GRANADA; 11; 67.45; 33;" and with circular "TYPE" label; in London.

MALE. Length 11.2 mm, greatest width 7.2 mm. Dorsally tan to light brown (slightly teneral). Clypeus trituberculate; median tubercle lower, smaller than lateral tubercle on each side; median tubercle slightly anterior in position; oblique and posterior carinae present, complete. Vertex abruptly concave between eyes, concavity deep, nearly circular, surface smooth and shining; vertex on each side of concavity closely punctate-setose. Pronotum (Fig. 54) with fossa on each side near anterior margin behind eye deep, diameter about three times width of anterior marginal bead; anterior pronotal margin lacking medium tubercle; midline approximately 1.0 mm posterior to anterior margin with large, laterally compressed, acutely angled horn or large tubercle; pronotum posterior to horn concave between inner carinae. Inner pronotal carina on each side extending from posterior indentation of fossa in arcuate curve to feeble obtuse angulation of carina at posterior fourth, carina then distinctly less elevated, bending sharply inward and inwardly smooth and flat to indented midline; posterior end of carina 0.4 to 0.5 mm anterior to posterior margin of pronotum. Outer pronotal carina approximately 1.0 mm long, straight, slightly closer to inner carina than to margin near posterior angle. Lateral pronotal fovea consisting of elongate depression, deepest at either end; lateral pronotal margin below fovea indented, marginal bead broken. Elytron with four or five feebly impressed striae; elytral surface irregularly punctate-setose, punctures more numerous on each side or in striae; setae semi-erect, dark brown. Metasternum between middle coxae very feebly convex, midline narrowly impressed, impunctate; surface otherwise with numerous, evenly spaced setose punctures; anterior edge very obtusely angulate. Fore tibia with five teeth on outer margin. Genitalia as in figs. 56, 57.

FEMALE (holotype). Length 9.7 mm, greatest width 5.7 mm. Similar to male except in the following respects: dorsally dark brown with clypeus, frons, and lateral thirds of pronotum reddish brown; median clypeal horn distinctly anterior in position, well-developed, as elevated as lateral tubercles; concavity of vertex smaller, vertex laterally granular, less setose; pronotum (Fig. 55) with median horn one-third size of male, concavity very shallow; posterior, transverse portion of inner carina only feebly indicated;

lateral carina slightly shorter; many setae on pronotum and elytra absent, loss seemingly due to abrasion.

MATERIAL EXAMINED: 3 males, 1 female.

COLOMBIA - 1, no other data. 1, Nova Grenada = Colombia, Panama, and Venezuela (holotype).

VENEZUELA - 2, Tachira, cr. San Cristóbal.

Specimens are in: Maracay, Paris, Howden.

REMARKS. Neoathyreus reichii is related to the centralis group of species, all having a pronounced tubercle on the pronotal midline distinctly posterior to the anterior margin. The indented lateral pronotal margin with the broken marginal bead will separate reichii from centralis and related species. These characters plus the five teeth on the fore tibia, central pronotal tubercle and odd shape of the inner pronotal carina will distinguish reichii from any other Neoathyreus. Most of the differences noted between the male and female of reichii are probably due to allometric growth caused by the difference in body size.

17. Neoathyreus pholas (Westwood)

Figures 58-60, Map 3

Athyreus pholas Westwood, 1848, p. 387; 1851, p. 462; Harold, 1880, p. 44.
Athyreus vulpinus Harold, 1880, p. 4. NEW SYNONYMY.

Lectotype of pholas Westwood here designated: male, labeled "pholas Buq.; Type, Westwood, Ann. Nat. Hist. p. 387, Coll. Hope Oxon.; Type, col: 497½, Athyreus pholas Westw., Hope Dept. Oxford"; and with my lectotype label; in Oxford. Paralectotype, male with same "type" labels as lectotype except "497 2/2"; in Oxford.

TYPE. vulpinus Harold labeled: "La Mesa; vulpinus Harold; green disc; Ex Musaeo E. Steinheil; Museum Paris ex coll. R. Oberthür, 1952"; in Paris.

MALES. Length 10.5 to 13.5 mm, greatest width 6.1 to 8.3 mm. Dorsally uniformly brown. Clypeus bituberculate, median tubercle absent, lateral tubercles strongly elevated, narrowly separated, carinate between and with posterior carina on each side arcuately extended posteriorly to inner anterior edge of gena; anterior face of clypeus lacking distinct carina, surface smooth or slightly roughened. Vertex concave between eyes, center of concavity smooth, sides granulate. Pronotum (Fig. 58) with deep fossa on each side contiguous with anterior marginal bead behind eye, diameter of fossa equal to two or three times width of adjacent marginal bead; anterior pronotal margin lacking median tubercle, but with large, laterally compressed tubercle on midline approximately 0.8 to 1.0 mm posterior to margin, tubercle occasionally connected anteriorly to margin by poorly delimited, narrow ridge or carina; posterior to tubercle pronotum moderately to deeply concave, concavity becoming shallow posteriorly. Pronotal carinae delimiting concavity unusual (Fig. 58). Inner carina on each side arising anteriorly in line with tubercle, then elevated and inwardly arcuate to abrupt, acute angle,posterior to angle inner carina poorly delimited or absent; posterior end of concavity delimited by bow-shaped outer carina joining one from opposite side at midline, outer end of each carina positioned midway between angle of inner carina and margin just anterior to posterior pronotal angle; inner end of outer carina curving anteriorly to midline, adjacent portion of concavity mostly smooth and impunctate, bottom of concavity punctate.

Lateral portions of pronotum granulate, fovea on each side elongate, narrow, shallow; pronotal margin below fovea very slightly indented, bead not broken, complete. Elytron basally with three or four striae very faintly indicated; surface closely punctate-setose. Metasternum between middle coxae feebly convex, anterior edge broadly, obtusely angulate; convex surface with well separated, shallow setose punctures. Fore tibia with five teeth on outer margin. Genitalia as in figs. 59, 60.

FEMALES. Length 11.3 to 12.5 mm, greatest width 7.1 to 7.8 mm. Similar to male except for the following obvious differences: clypeus trituberculate; median tubercle slightly lower and anterior in position to lateral tubercles near lateral margins; posterior carina connecting clypeal tubercles moderate in development; anterior face of clypeus on each side with feebly oblique carina almost meeting carina extending anteriorly from median tubercle; anterior face of clypeus strongly rugose in unworn specimen.

MATERIAL EXAMINED: 7 males, 9 females.

COLOMBIA - Bogotá; Gigante-Huila; Ibaqué; La Mesa; Muzo, X. One specimen almost certainly mislabeled "Brazil".

Specimens are in: Berlin, Brussels, Dresden, Oxford, London, Maracay, Munich, Paris, Howden.

REMARKS. Neoathyreus pholas is probably most closely related to the Mexican-Central American fissicornis Harold. The sharply pointed median pronotal tubercle and larger size will separate pholas from that species and the odd position of the inner and outer pronotal carinae (Fig. 58) coupled with the range of pholas (Colombia) will separate it from any South American species.

Nothing is known of the habits and few recently collected specimens have been seen.

18. Neoathyreus centralis (Westwood)

Figures 61-65, Map 4

Athyreus centralis Westwood, 1848, p. 387; 1851, p. 463.

TYPE. Male (? not dissected, very teneral, poor condition), labeled "Athyreus centralis W., Magdalena, . . . [line illegible], . . . Ibaqué; Columbia [circular label], 46-20 [reverse side];" and with circular "Type" label, in London.

MALES. Length 12.9 to 13.1 mm, greatest width 7.3 to 7.5 mm. Dorsally uniformly tan or brown. Clypeus trituberculate; median tubercle twice height of lateral tubercles, distinctly anterior in position, anterior base rising from anterior clypeal edge; lateral tubercle on each side elongate, slightly inclined laterally above antennal insertion; clypeus with oblique carina on each side and posterior carina between tubercles relatively feebly developed. Vertex between line of genae concave, concavity circular in shape, center smooth, surrounding area rugose or closely granulate. Pronotum (Fig. 61) with fossa on each side behind eye very small, shallow, diameter of fossa less than width of adjacent anterior marginal bead; anterior pronotal margin lacking median tubercle. Pronotum in center of disc with elongate, laterally compressed keel approximately 0.5 to 0.6 mm in height and 1.5 or 1.6 mm long; anterior margin slanted posteriorly and rounded to flattened dorsal edge; keel posteriorly abruptly rounded, vertical or slightly undercut; pronotum on each side of keel feebly, elongately concave,

posterior to keel with shallow, sparsely punctate, transverse concavity; concavities on each side delimited by inner carina, anterior end of carina beginning at anterior third of pronotal length, low, slightly arcuate, feebly convergent to anterior outer edge of transverse concavity, carina highest at that point, then obtusely angled downward, carina then slightly to distinctly reduced in width, straight to feebly inwardly curved at posterior end 0.1 to 0.2 mm anterior to posterior pronotal margin. Outer pronotal carina 1.1 to 1.5 mm in length, arcuate, slender; positioned midway between inner carina and inwardly arcuate pronotal margin just anterior to posterior angle; arcuate portion of margin with adjacent elongate groove, surface of groove smooth, deepest adjacent to posterior angle. Lateral pronotal fovea on each side very shallow, small; lateral pronotal margin below fovea very slightly indented, marginal bead complete. Elytron basally with two or three striae feebly indicated; surface of elytron rugose or granulate and punctate, most punctures each with semi-erect seta. Metasternum between middle coxae feebly convex, anterior edge obtusely angulate; metasternal surface with evenly scattered, small, setose punctures. Fore tibia with five teeth on outer margin. Genitalia as in figs. 64, 65.

FEMALE. Length 12.1 mm, greatest width 7.0 mm. Similar to males except in the following respects: clypeus with median tubercle lower, slightly smaller; oblique clypeal carina more strongly developed; posterior transverse clypeal carina indistinct; concavity of vertex with two-thirds reduction in diameter; pronotum (Figs. 62, 63) with keel, inner and outer carinae slightly lower (probably due to somewhat smaller size); pronotal surface more completely granulate; entire dorsum more conspicuously setose.

MATERIAL EXAMINED: 3 males, 3 females.

COLUMBIA - Gigante-Huila, I. Magdalena (holotype): Tolima, Cañón del M[agdalena]; 1500 m, X.

PERU - Huánuco Dept., Cordillera Azul, 39 km NE Tingo María, 1700 m, I; Santa Ana.

Specimens are in: Berlin, London, Maracay, Howden.

REMARKS. Only a few species of Neoathyreus have a distinct, laterally compressed keel on the pronotal midline near the center of the disc. Only centralis has the keel distinctly longer than high. This character coupled with the characters of the head, complete marginal bead of the lateral pronotal margin and the five teeth on the outer edge of the fore tibia should be sufficient to distinguish centralis. The most closely related species is lingi from Ecuador.

19. Neoathyreus lingi n. sp.

Figures 66-68, Map 4

HOLOTYPE. Male, length 10.3 mm, greatest width 6.3 mm. Dorsally very dark brown with sides of pronotum reddish-brown. Clypeus with oblique carina on each side distinct, posterior carina feebly indicated; median tubercle strongly developed, anterior in position, anterior face almost vertical, lateral tubercle on each side moderate in size; surface between lateral and median tubercles depressed. Vertex between eyes with distinct, nearly circular depression medially between eyes, surface of concavity smooth or nearly so, remainder of vertex closely granulate, each granulation with long, erect, tan seta at base. Pronotum (similar to female, Fig. 66) with relatively small fossa on each side contiguous with anterior marginal

bead behind eye; width of fossa approxima tely equal to width of adjacent bead; anterior pronotal margin between fossae only gradually elevated to midline, bead thickened at midline, marginal tubercle lacking. Pronotum centrally with laterally compressed upright lobe on midline, pronotum shallowly concave on each side and anterior to lobe; inner pronotal carina on each side of lobe evenly arcuate in dorsal view, most distinctly elevated adjacent to lobe becoming lower and slightly narrower posteriorly; surface of concavity between inner carinae punctate-granulate, most punctures each with upright seta. Outer pronotal carina on each side present only posteriorly; slender, feebly elevated, slightly closer in position to inner carina than to lateral pronotal margin just anterior to posterior angle. Lateral pronotal fovea on each side feebly indicated by irregular elongate depression; pronotal margin below fovea not indented, marginal bead complete, not reduced. Elytron with three or four feebly depressed striae; striae and surface between irregular and with scattered coarse punctures, each with almost erect, long, slender seta; surface between punctures dull. Metasternum between middle coxae feebly convex, anterior edge obliquely angulate, apex of angle with sharp tubercle; surface of metasternum with scattered shallow punctures, some punctures each with long seta (others lacking setae due to abrasion). Fore tibia with five teeth on outer margin. Genitalia as in figs. 67, 68.

ALLOTYPE. Female, length 13.2 mm, greatest width 7.4 mm. Similar to holotype except in the following respects: vertex more deeply concave; pronotum with median central lobe more strongly developed (Fig. 66); pronotal concavity slightly more pronounced; lateral pronotal margin below fovea very slightly indented; elytral surface more roughened; pygidium more convex, apex more rounded.

TYPE MATERIAL: Holotype, male, O. Ecuador, Macas, E. Feyer S. (Washington).

Allotype, female, Ecuador, Napo Prov., 2000 m, 7 km S. Baeza, 21.II.1979, H. & A. Howden, [flying to black light at dusk](Howden).

PARATYPES: 4 females.

ECUADOR - 3, same data as allotype, except 1 collected 22.II. and 1 on 25.II.1975. 1, Napo, San Francisco de Barja [sic], 15.V.1975, at black light, Spangler, Gurney, Langley, and Cohen.

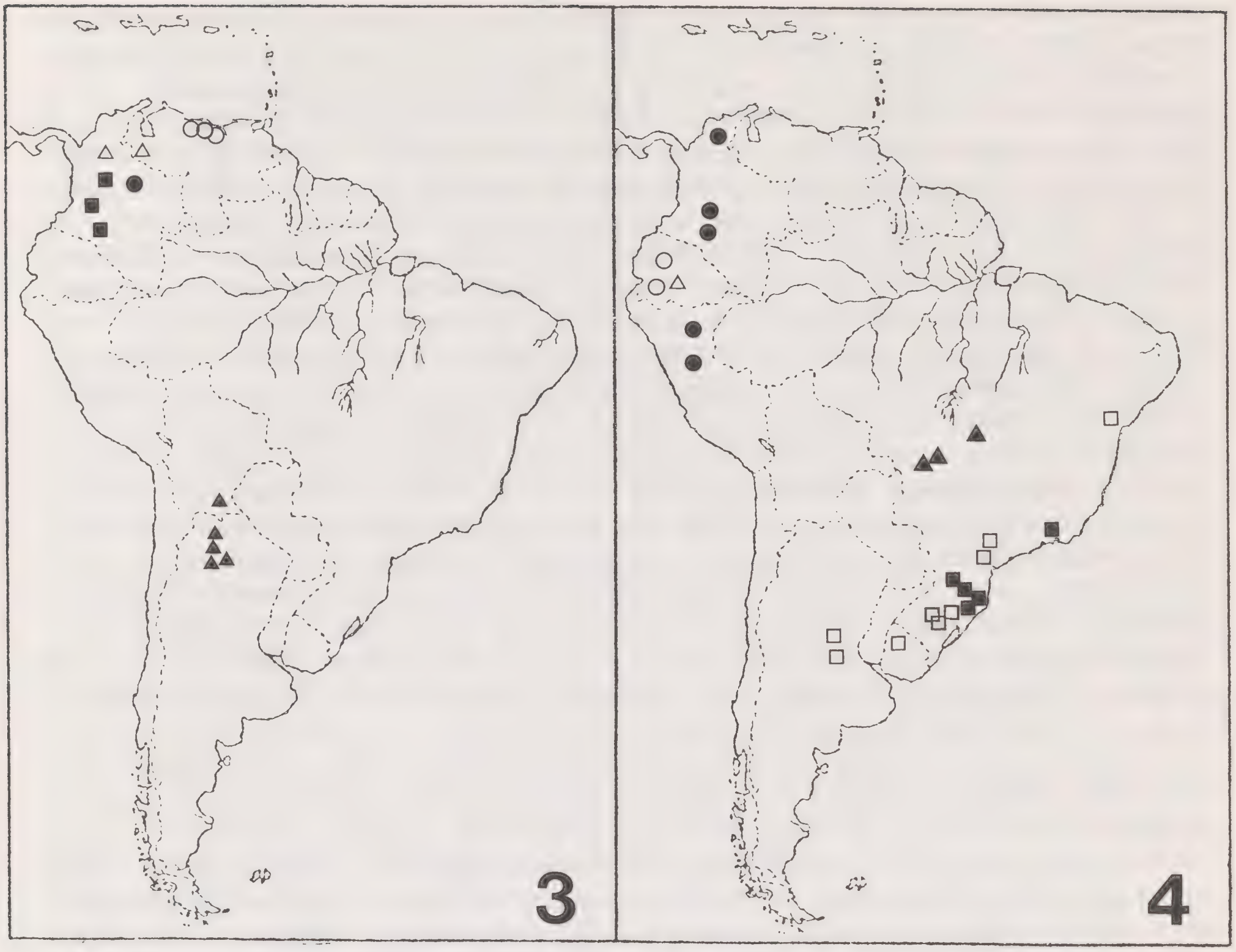
Paratypes are in: Washington, Howden.

REMARKS. The holotype represents the smallest specimen seen and the allotype the largest. One paratype has six teeth on the outer margin of the fore tibia. In other respects the series shows little variation.

Neoathyreus lingi is most closely related to reichii and centralis, possibly slightly less so to the former. Both reichii and centralis have the pronotum uniform in color. In reichii the pronotal concavity is posterior to the upright lobe on the midline. In centralis the central protrusion is keel-like and often abruptly declivous near the posterior end, the inner carina on each side is angulate near the posterior end.

The area in which lingi was personally collected was partly cut over wet mountain forest with open grassy areas. All specimens came to a 15 watt black light at dusk.

The species is named in honour of Mr. L.E.C. Ling who is not only responsible for the excellent S.E.M. pictures of Neoathyreus but who has also collected scarabs with me in Ecuador in localities in which some of the Neoathyreus have been taken.



●=13. peckorum n. sp.
○=14. corniculatus (Felsche)
▲=15. lobus n. sp.
△=16. reichii (Westwood)
■=17. pholas (Westwood)

●=18. centralis (Westwood)
○=19. lingi n. sp.
▲=20. goyasensis (Boucomont)
△=21. boosi n. sp.
■=22. catharinae (Bates)
□=23. corinthius (Klug)

20. Neoathyreus goyasensis (Boucomont)

Figures 69-71, Map 4

Athyreus goyasensis Boucomont, 1902b, p. 585.

TYPE. Male, labeled "Athyreus goyasensis B. type; Jatahy, Prov. Goyas, Brésil; Typus [red label]; Museum Paris, 1938, Coll. A. Boucomont"; in Paris.

MALES. Length 10.0 to 10.6 mm, greatest width 6.6 to 6.8 mm. Dorsally reddish brown. Clypeus with both oblique and posterior carinae strongly developed; median tubercle pronounced, slightly longer than wide at apex and approximately twice height of lateral tubercle on each side, posterior carina on each side depressed below level of tubercles. Vertex between eyes flat to very feebly convex, surface granulate, posterior base of some granulations each with semi-erect, long, tan seta. Pronotum (Fig. 69) with moderate sized fossa on each side contiguous with marginal bead posterior to eye; fossa three or four times width of adjacent bead; pronotal margin between fossae strongly elevated to small tubercle at midline,

tubercle and margin forming obtuse angulation. Pronotum with inner carina on each side arising approximately 1.0 mm behind fossa, carina abruptly elevated to acute angulation, angulation of carina nearly vertical, not directed inward; carina at posterior base of angulation briefly very feeble or absent then becoming distinct to elevated posterior end about 0.4 to 0.5 mm before posterior pronotal margin; posterior portion of carina behind angulation nearly parallel to and closer to impressed midline; broad concavity present primarily between anterior angulate portions of carinae; midline and band on each side near posterior of concavity smooth, remainder of surface granulate-punctate, most punctures each with tan seta. Outer pronotal carina on each side, midway between posterior base of angulation of inner carina and posterior marginal angle, very short, 0.4 to 0.6 mm in length, feebly developed, occasionally indistinct. Pronotum on each side with fovea small, circular; lateral pronotal margin below fovea not indented, marginal bead not interrupted. Elytron lacking distinct striae or elevated intervals; surface closely punctate-granulate, each puncture with semi-erect tan seta. Metasternum between middle coxae very feebly convex, midline not impressed, anterior edge at midline with pronounced obtuse angle; metasternal surface punctate-granulate, puncture at base of granule shallow, bearing long tan seta. Fore tibia with six teeth on outer margin, basal tooth minute. Genital capsule broadly rounded at base of short sharply angulate apex. Genitalia as in figs. 70, 71.

FEMALE. Length 9.5 mm, greatest width 6.0 mm. Differing from males as follows: clypeus with median tubercle reduced in height and more posterior in position, oblique carina on each side merging anterior to median tubercle, a single median carina extending from junction posteriorly to median tubercle; lateral tubercles less pronounced, only slightly lower than median tubercle; vertex more closely granulate (a function of smaller size?); pronotum more coarsely granulate; inner pronotal carina more elongate, anterior angulation feebly elevated, obtuse; inner carina not interrupted posterior to angulation; pronotal concavity less pronounced, entirely granulate except indented portion of midline; outer pronotal carina on each side obsolete; pygidium more convex, apex more rounded.

MATERIAL EXAMINED: 3 males, 1 female.

BRAZIL - Goiás: Jataí (= Jatahy); Monjolinho; Rio Verde.

Specimens are in: Dresden, Paris, Howden.

REMARKS. The variation noted between males and females may be, at least in part, influenced by size. From the material at hand, the degree of influence that size differences have on various characters is impossible to determine. Large males can be recognized by the sharply angulate anterior half of the inner pronotal carina, by the posterior base of the angulation having the carina obsolete, reappearing posteriorly, nearly parallel and closer to midline. The feebly developed lateral pronotal carina is also useful.

21. Neoathyreus boosi n. sp.

Figure 72, Map 4

HOLOTYPE. Female, length 17.4 mm, greatest width 9.4 mm. Dorsally dark brown with lateral fourth of pronotum on each side reddish brown. Clypeus with both oblique and posterior carinae present but weakly developed, strongly depressed between large tubercles; median tubercle

slanted anteriorly over anterior edge of clypeus; lateral tubercle on each side positioned in line with antennal insertion, apex of tubercle separated from lateral margin by approximately 0.5 mm; tubercle upright and transverse; posterior carina between tubercles similar to inverted "Y", the base formed by elevated midline posterior to median tubercle. Vertex between eyes broadly concave in central three-fourths, surface granulate to rugose-punctate; most punctures each with erect, tan seta. Pronotum (Fig. 72) with cone shaped fossa on each side near anterior marginal bead behind eye, fossa three to four times width of adjacent bead; margin between fossae gradually elevated to large erect, cylindrical, pointed tubercle on midline posterior to and contiguous with marginal bead. Inner pronotal carina viewed from above having the outline of a figure "8", larger anterior half with carina anteriorly obsolete, indicated by declivous sides of concavity; center of figure marked by acutely angled, transversely, inwardly directed spur of each carina; carina posterior to angle curving inwardly to midline, posterior two thirds flattened, posterior edge similar to shape described for lyriferus. Pronotal concavity most pronounced and deepest anterior to acute angles of inner carinae, surface of concavity with irregularly spaced small punctures. Outer carina on each side divided into two parts; anterior portion consists of feebly developed, irregular extension of inner carina extending to area immediately anterior to lateral fovea, carina not noticeably elevated, only evident as irregular smooth areas; posterior portion of outer carina moderately elevated, feebly arcuate, positioned midway between carina and indented pronotal margin at posterior angle, carina approximately 2.2 mm long. Pronotum laterally with fovea small, edge of pronotum below fovea not indented, marginal bead complete. Left elytron with three feebly elevated intervals between suture and umbone, surface closely, irregularly punctate, most punctures each with semi-erect tan or black seta (right elytron missing). Metasternum between middle coxae flat, midline slightly elevated, anterior edge with sharp, obtuse angle at midline; surface of metasternum with numerous shallow punctures, each with long semi-erect tan seta. Fore tibia with five distinct teeth on outer margin, sixth basal tooth vaguely indicated on left tibia (absence due to abrasion?).

MALE. Unknown.

TYPE MATERIAL: Holotype, female, S.E. Ecuador, Morona Santiago, Logrono [sic], 1075 m. 17.VI.84 (Howden).

REMARKS. The three strongly developed clypeal tubercles and the transverse, inwardly directed acute angles at the middle of the inner pronotal carinae will distinguish boosi from the closely related lyriferus or accinctus. In the key boosi stands beside catharinae but is not closely related.

Neoathyreus boosi is named for Julius Boos who has collected and sent to me a number of interesting and rare Ecuadorian Scarabaeidae including the above and several other Neoathyreus.

22. Neoathyreus catharinae (Bates)

Figures 73-75, Map 4

Athyreus catharinae Bates 1887, p. 110.

LECTOTYPE here designated. Male, labeled "catharina Bates, S. Catharina Brazil; Ex Musaeo H.W. Bates 1892; Museum Paris ex Coll. R. Oberthür, 1952"; and with "Type" label; in Paris.

MALES. Length 11.4 to 13.1 mm, greatest width 7.1 to 7.9 mm. Dorsally dark brown (non-teneral specimens) with clypeus, lateral third of pronotum, and often each elytral umbone tan or reddish brown. Clypeus with both oblique and posterior carinae strongly developed; median tubercle anterior in position with face rising almost vertically 0.8 to 1.1 mm above anterior clypeal margin, tubercle slender, rounded apex slightly longer than wide; lateral tubercle on each side low, feebly developed. Vertex slightly, irregularly convex, flat at base of frons, surface rugose with numerous erect, tan setae. Pronotum (Fig. 73) with small fossa on each side contiguous with anterior marginal bead behind eye, fossa approximately twice width of adjacent bead; pronotal margin convex between fossae, midline frequently with low keel or extension of bead extending posteriorly approximately 0.5 mm; neither keel nor midline distinctly tuberculate. Inner pronotal carina on each side becoming evident about 1.0 mm behind fossa, carina slanted upward and inward, terminating about middle of pronotum in acute, elevated point; carina posterior to point low, only outer margin delimited, inner portion forming large, smooth area extending across posterior of concavity; concavity most pronounced in anterior half and irregularly rugose-punctate. Outer pronotal carina on each side feebly developed, posterior end arising near posterior flared portion of inner carina; carina approximately 1.0 mm long, positioned above marginal indentation of posterior angle; lateral fovea lacking anterior carina, fovea oval, pronotal margin below fovea not indented, bead complete. Elytron lacking distinct striae or intervals on disc, surface irregularly rugose-punctate, each puncture with moderately long, semi-erect, tan seta. Metasternum between middle coxae almost flat, midline feebly indented, anterior edge at midline obtusely angulate; surface of metasternum finely punctate, each puncture with long tan seta. Fore tibia frequently with four teeth on outer margin, rarely, small basal, fifth tooth present. Genital capsule sharply rounded at apex, apex closely setose. Genitalia as in figs. 74, 75.

FEMALES. Length 9.5 to 12.5 mm, greatest width 6.5 to 8.0 mm. Differing from males of similar size mainly in having median clypeal tubercle reduced in height and in pygidium being more convex with more broadly arcuate margin. The smallest female with inner pronotal carina on each side greatly reduced in development with median angulation obtuse and feebly elevated, flattened posterior portion of concavity mostly punctate, only small lateral area on each side adjacent to carina impunctate; outer carina feeble, length reduced to 0.8 mm.

MATERIAL EXAMINED: 15 males, 16 females.

BRAZIL - Espírito Santo. St. Catharina: Corupá, I, IX; Hansa (= Corupá); Joinvile; Rio Natal, I; Salto do Pirahy near Jaraguá. Theresópolis.

Specimens are in: Berlin, Brussels, Dresden, London, New York, Paris, São Paulo, Washington, Howden.

REMARKS. Small or teneral specimens of catharinae may be difficult to place except by association, locality and use of male genitalia. However, the majority of speciments can be identified by the following combination of characters: strongly developed median clypeal tubercle; acute, inwardly directed angle of inner pronotal carina; unmodified lateral margins of pronotum and lateral third of pronotum distinctly lighter in color than central third (concavity). The closest relative to catharinae is cuspinotatus and to a lesser degree boosi from Ecuador.

23. Neoathyreus corinthius (Klug)

Figures 76-79, Map 4

Athyreus corinthius Klug, 1843, p. 32.
Athyreus violaceus Klug, 1843, p. 33. NEW SYNONYMY.

TYPE. Male, labeled "corinthius Klug*, Brasil. Virm. [green label]; 25639; Typus [red label]"; in Berlin.

TYPE. Female, labeled "violaceus Klug*, Brasil. Virm. [green label]; 25641; Typus [red label]"; in Berlin.

MALES. Length 8.2 to 12.2 mm, greatest width 6.1 to 7.1 mm. Dorsally dark brown, or head and pronotum black with elytra reddish brown except black on margins and apically on and near suture, or dorsally entirely black (types). Clypeus with oblique and posterior carinae distinct; median tubercle anterior to lateral tubercle on each side, more strongly elevated; lateral tubercle feebly developed, positioned above mandibular base. Vertex flat to feebly concave, surface granular-rugose to closely granular. Pronotum (Fig. 76) with deep, distinct fossa on each side contiguous with anterior marginal bead behind eye, fossa three to four times width of adjacent bead; pronotal margin between fossae elevated to form obtuse angle at midline, small, distinct tubercle at posterior of bead forming apex of angle. Inner pronotal carina on each side strongly rounded in cross section, uniform in height, most widely separated anteriorly and feebly arcuate, closer to midline posteriorly and almost straight; concavity shallow and entirely punctate-granulate (type of violaceus) to moderate in depth with posterior third or half smooth, occasional punctures present; most punctures each with erect greyish-black seta. Outer pronotal carina variable; in large specimens short (0.5 mm) anterior carina present just anterior to lateral fovea, carina absent in small specimens (eg. type of violaceus); all specimens with posterior, feebly arcuate to sinuate carina 1.0 to 1.5 mm long; carina distinctly closer to indentation anterior to posterior angle of lateral margin than to inner carina; lateral pronotal margin not indented below lateral fovea, marginal bead not interrupted. Elytron with three or four feebly impressed, irregularly punctate striae between suture and umbone; raised intervals with smooth portions shining, remainder of surface irregularly punctate; most punctures each with semi-erect to erect seta. Metasternum flat to feebly convex, anterior edge obtusely angled, angle at midline sharp; surface of metasternum with shallow, scattered punctures each with long, pale seta. Fore tibia with five (violaceus) or six (corinthius) teeth on outer margin; development of basal tooth varying from absent, to feeble, to distinct. Genitalia as in figs. 78, 79.

FEMALES. Length 7.8 to 11.8 mm, greatest width 5.2 to 6.9 mm. Females similar to males of similar size except median clypeal tubercle slightly reduced and pygidium more convex and apically rounded.

MATERIAL EXAMINED: 6 males, 9 females.

ARGENTINA - Córdoba: Dique Los Molinos, I; Santa María, I.

BRAZIL - Bahia. Rio Grande do Sul: Caracol do Gramado, 850 m, I; Santo Augusto, X; São Leopoldo. São Paulo: Mazcilac [sic], IX.

URUGUAY - Salto: Tierras Coloradas, XII.

Specimens are in: Berlin, London, Pittsburgh, São Paulo, Tucumán, Howden.

REMARKS. It is not surprising that Klug thought the small female of corinthius was distinct from the male. The female (Fig. 77) he described under the name violaceus is the smallest specimen seen while the male type

of corinthius is one of the largest males seen. Fortunately enough additional material has become available to indicate that the differences noted by Klug can all be attributed to variation within one species. Hence the name violaceus is placed in synonomy under corinthius which has page priority.

Since both the color and outer pronotal carina show considerable variation, identification is best done by using the key and checking the characters of the male genitalia. The species is most likely to be confused with lanei, but the latter has a more northern range and the lateral margin of the pronotum is indented below the fovea.

24. Neoathyreus tridentatus (Macleay)

Figures 80-82, Map 5

Athyreus tridentatus Macleay, 1819, p. 124; Laporte, 1840, p. 102; Klug, 1843, p. 26.

Athyreus bicolor Laporte, 1840, p. 103; Klug, 1843, p. 30; Westwood, 1851, p. 464; Boucomont, 1911, p. 346.

TYPE. tridentatus Macleay, locality listed as "Brazil"; location of type uncertain, possibly in Macleay collection in Sydney.

TYPE. bicolor Laporte, location uncertain, according to Westwood (1851, p. 464) type is in Oxford (Hope coll.); if so, it is not labeled.

MALES. Length 10.9 to 14.1 mm, greatest width 6.8 to 7.9 mm. Dorsally tan (teneral), light brown or (usual condition) dark brown with lateral thirds of pronotum light brown or reddish brown. Clypeus tuberculate, median clypeal tubercle two or more times height of lateral tubercles, anterior in position, face of median tubercle rising almost vertically (in large males) above anterior clypeal edge; oblique clypeal carina on each side distinct at base of median horn, becoming less pronounced on each side near anterior, lateral clypeal angle; posterior clypeal carina distinct between tubercles. Vertex flat or very feebly concave near midline, surface evenly granulate. Pronotum (Fig. 80) with fossa on each side behind eye small, diameter approximately equal to width of adjacent anterior marginal bead; anterior pronotal margin at midline with acute, laterally compressed tubercle, maximum height of tubercle in large males about 0.6 to 0.7 mm. Pronotum posterior to anterior marginal tubercle abruptly, deeply concave, concavity extending posteriorly for approximately 2.5 to 3.0 mm; midway of length, sides of concavity tumid, abruptly limiting deeper portion to area along midline; concavity posteriorly limited by transverse smooth area. Inner pronotal carina on each side of concavity with feeble, very broadly oblique raised angle near middle above tumid area, or carina sinuate at middle (small males); posterior portion of carina strongly curved toward midline and partly enclosing smooth, transverse end of concavity; carina ending at approximately equal distance from midline or from adjacent posterior pronotal margin. Outer pronotal carina on each side varying from 0.5 to 1.3 mm in length, straight or feebly arcuate, positioned almost midway between inner carina and emarginate area of margin just before posterior angle; lateral pronotal fovea shallow, with brief, feeble carina adjacent to anterior edge and no longer than fovea, carina only rarely completely absent; lateral pronotal margin below fovea not indented, marginal bead complete. Elytron with two or three faintly indicated striae; surface closely punctate-setose, or rugose. Most elytral surface relatively dull to feebly shining. Metasternum between middle coxae flat, anterior edge obliquely

angled, angle pointed; surface with evenly spaced shallow setose punctures. Fore tibia with four (as described by Macleay, 1819) or five teeth on outer margin, one specimen with four teeth on one side, five on other. Genitalia as in figs. 81, 82.

FEMALES. Length 11.0 to 15.1 mm, greatest width 7.2 to 8.2 mm. Similar to males except in the following respects: median clypeal tubercle only slightly higher than lateral tubercles; all clypeal carinae strongly developed; anterior portion of pronotal concavity slightly shallower and less abrupt than in males of similar size.

MATERIAL EXAMINED: 81 males, 128 females.

ARGENTINA - Misiones: near San Ignacio.

BRAZIL - 100, no data. Bahia. Espírito Santo. Goiás: Monjolinho, XI. Minas Gerais: V. Monte Verde, II, XII. Paraná: Curitiba, IV. Rio Grande do Sul: Col. Santa Cruz. Rio de Janeiro: Corcovado, II, IX; Guanabara, X, XI; Petrópolis. Santa Catharina: Caúna, II; Nova Teutônia, 27°11'S, 52°23'W, III, IV, IX, XII; Rio Natal, IV, IX; Rio Vermelho, III. São Paulo: Cerqueira César; Cipó, XII; Ribeirão Pires; São Paulo, XI.

Specimens are in Berlin, Brussels, Cambridge, Dresden, Eberswalde, Geneva, London, Munich, New York, Oxford, Paris, Pittsburgh, São Paulo, Tucumán, Washington, Howden.

REMARKS. There has been some confusion concerning the application of the name tridentatus Macleay. In Macleay's description (1819) four pertinent points are mentioned: color brown, pronotum with anterior median acute tubercle and with two lateral oblique angles (inner carina?), fore tibia with four teeth (in observations under description) and locality Brazil. While some specimens of tridentatus as defined herein have a minute basal fifth tooth on the fore tibia, many well developed males have only four teeth, may be almost uniform brown, and have a very distinct acute median tubercle on the anterior pronotal margin. It is the only species that is known to occur in Brazil that coincides with Macleay's description. In 1851 Westwood figured Laporte's species, bicolor, and there is little doubt that it is the same as tridentatus. In 1911 Boucomont suggested the above synonomy and many of the older specimens of tridentatus in European collections have been correctly identified.

Most of the major variation noted has been incorporated in the description. Approximately two-thirds of the specimens seen have the pronotum bicolored. The color along with the acute tubercle on the anterior pronotal margin at the midline, the shape of the pronotal carinae and concavity should distinguish well-developed specimens from other South American species of Neoathyreus. The faint, short carina frequently present just anterior to the lateral pronotal fovea is also a useful character.

Small, uniformly colored specimens may be confused with some lanuginosus but the clypeal characters and those of the lateral margins of the pronotum should separate the two. However the male genitalia (if available) is the most useful character for identification in minor specimens.

25. Neoathyreus politus n. sp.

Figures 83-85, Map 5

HOLOTYPE. Male, length 13.6 mm, greatest width 7.8 mm. Dorsally dark reddish brown with head and lateral sides of pronotum tan to reddish brown. Clypeus with both oblique and posterior carinae strongly developed; median tubercle with acute apex, anterior face rising almost vertically above anterior clypeal edge; lateral tubercle on each side above antennal insertion small, less than half height of median tubercle. Vertex slightly convex laterally, flat medially between eyes, surface closely granular, each granule with erect, long, tan seta at base. Pronotum (Fig. 83) with moderate sized fossa on each side contiguous with anterior marginal bead behind eye; fossa two to three times as wide as adjacent bead; anterior pronotal margin between fossae moderately elevated to midline; marginal bead at midline contiguous with slightly elongate, conical tubercle with apex about 0.3 mm posterior to margin. Inner pronotal carina on each side arising about 1.0 mm behind fossa, carina slightly elevated and feebly angulate near middle, carina gradually converging posteriorly with opposite carina, posterior ends separated by approximately 1.0 mm; each ending about 1.0 mm before posterior pronotal margin; concavity deep, deepest portion flat, surface smooth and polished, sides of concavity below angulation of each carina not tumid, sides smooth, steep, feebly punctate near carinae. Outer carina only present posteriorly, about 1.5 mm long, positioned slightly closer to lateral margin adjacent to posterior angle than to inner carina. Lateral pronotal margin below shallow fovea not indented, marginal bead not broken or reduced. Elytron with four or five feebly defined striae on disc, elytral surface with numerous coarse punctures, each with long, semi-erect, tan seta; surface between punctures smooth, shining. Metasternum between middle coxae feebly convex, anterior edge obtusely angulate, apex of angle sharp; surface of metasternum with numerous fine punctures, each with minute anterior granule and elongate, almost upright seta; metasternum partly obscured by setae. Fore tibia with five distinct teeth and basally with suggestion of sixth tooth on outer margin. Genitalia as in figs. 84, 85.

FEMALE. Unknown.

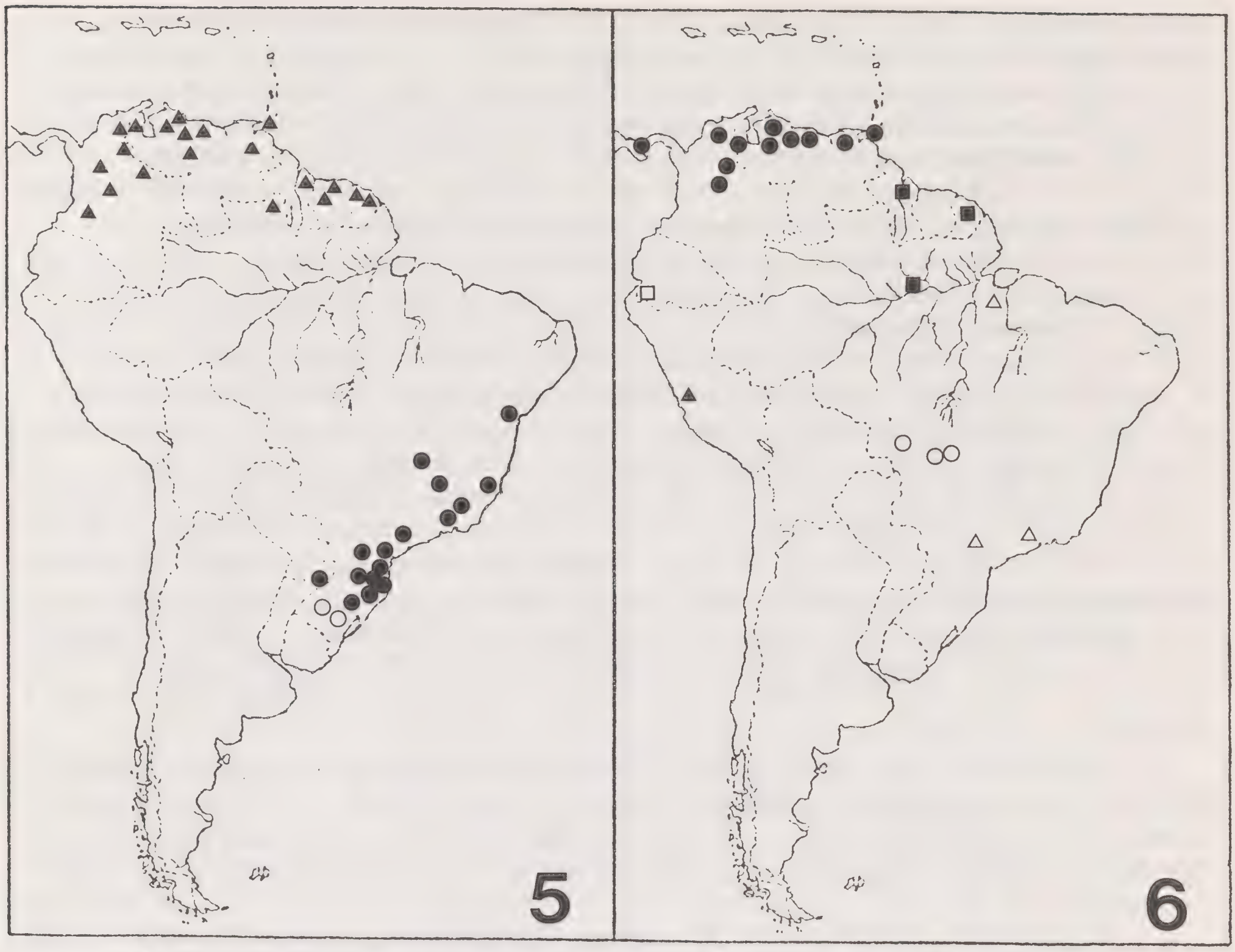
TYPE MATERIAL: Holotype, male, Brazil, Rio Grande do Sul, Santo Augusto, X.1966, O. Roppa (Pittsburgh).

PARATYPE: 1 male.

BRAZIL - Espírito Santo [31°44'S 53°02'W (?)].

Paratype is in: London.

REMARKS. Neoathyreus politus is most closely related to tridentatus. It differs from that and other related species by its highly polished pronotal concavity. In addition the five distinct teeth on the fore tibia will separate politus from tridentatus which usually has only four distinct teeth on the fore tibia.



● = 24. tridentatus (Macleay)
○ = 25. politus n. sp.
▲ = 26. excavatus (Laporte)

● = 27. lanei (Martínez)
○ = 28. obscurus n. sp.
▲ = 29. ornatus n. sp.
△ = 30. caesariatus n. sp.
■ = 31. illotus n. sp.
□ = 32. versicolor n. sp.

26. Neoathyreus excavatus (Laporte)

Figures 3-5, 86-88, Map 5

Athyreus excavatus Laporte, 1840, p. 103; Klug, 1843, p. 27; Westwood, 1851, p. 464; Bates, 1887, p. 110.
Neoathyreus quadridentatus Howden, 1964, p. 18; Howden, 1974, p. 567. NEW SYNONYMY.

TYPE. excavatus Laporte, location uncertain. Possibly male with green label "Athyreus excavatus de Laporte . . . [line illegible] . . . juvencus Dej, Cayenne"; in Oxford. This is certainly not Laporte's label, but the specimen matches the original description (has four teeth on fore tibia), and according to Westwood, 1851, the type is in the Hope collection.

TYPE. quadridentatus Howden, labeled "Lake Catemaco, Veracruz, Mexico, 8-16.VIII.1960, H.F. Howden; CNC No. 8431"; in Ottawa.

MALES. Length 9.5 to 14.1 mm, greatest width 6.4 to 8.5 mm. Dorsally tan to brown relatively uniform in color. Clypeus trituberculate, median tubercle best developed, higher and anterior to poorly developed lateral tubercles; oblique carina present on each side of median tubercle,

occasionally indistinct near anterior base of tubercle; posterior carina extending between tubercles strongly developed. Vertex flat to very feebly concave, evenly granulate or rugose. Pronotum (Fig. 86) with fossa on each side behind eye deep, diameter between one and two times width of adjacent anterior marginal bead, anterior pronotal margin with small, conical tubercle at midline, pronotum posterior to anterior margin relatively evenly, shallowly concave, concavity deepest along feebly indented midline, sides delimited by arcuate inner carina and posteriorly by impunctate, transverse smooth area. Inner carina relatively narrow, arcuately convergent with opposite carina to posterior third of pronotum, then nearly parallel, ending 0.4 to 0.6 mm anterior to posterior margin. Outer carina approximately 1.5 to 2.0 mm long, positioned midway between inner carina and inwardly arcuate pronotal margin at posterior angle. Lateral pronotal fovea on each side moderately deep, lateral margin below with marginal bead broken. Pronotal surface, except for carina and transverse smooth area at posterior of concavity, evenly granulate, similar to vertex. Elytron with four or five very feebly indicated striae, surface relatively uniformly granular, setose. Metasternum between middle coxae feebly convex, surface closely, shallowly punctate-setose, anterior edge of metasternum very broadly, obtusely angled, margin rounded except for small, sharp point at midline; midline feebly indented. Fore tibia with four teeth on outer margin. Genitalia as in figs. 87, 88.

FEMALES. Length 10.3 to 14.5 mm, greatest width 6.4 to 8.8 mm. Similar to male, differing slightly in similar sized (male vs. female) specimens by a slight reduction in height of posterior clypeal carina; pronotal concavity slightly less concave; inner pronotal carina occasionally lower or narrower.

MATERIAL EXAMINED: 40 males, 48 females.

BRAZIL - Roraima: Surumu, IX.

COLOMBIA - 3, no other data. Antioquia: Valle de Medellín, X. Bogotá. Magdalena: Río Frío, VII. Santander: Bucaramanga, IV; N. de Santander, Santiago, 700 m. V. Valle del Cauca, Cali, I.

FRENCH GUIANA - Cayenne. Gourdonville. Maroni. Nouveau Chantier, VII. Passoura, Riv. de Kourou.

GUYANA (British Guiana) - Blairmont. Kartabo, VI. Rupununi, VI.

SURINAM - Kabo, VI. Paramaribo, IV, V, VIII, X. Saramacca, Coebiti Exp. Farm, in soil at depth of 0.8 meter.

TRINIDAD - Port of Spain.

VENEZUELA - Aragua: El Limón, 450 m, V, VI, X; Maracay, 450 m, VI, XI. Bolívar, XI. Carabobo: Las Trincheras, VI; Tacarigua, VI; Valencia, IV. Caracas. Falcón: San Luis, XI. Guárico: Calabozo, V, VI. Lara: El Cují, VI; Iribarren, VIII. Monagas: Uverito, 50 m, VI, X. Zulia: Maracaibo, X, XI.

Specimens are in: Brussels, Chicago, Leiden, London, Maracay, Oxford, Paris, Pittsburgh, São Paulo, Washington, Howden.

REMARKS. The name excavatus (Laporte) has been commonly misapplied for a number of years to the Brazilian species currently called lanuginosus (Klug). The confusion has possibly stemmed partly from the uncertainty over the identity of the type specimen of excavatus and partly over the repair of one of Klug's cotypes of lanuginosus in which the apparently lost head and pronotum was replaced by gluing on the head and pronotum from a specimen of excavatus. Since specimens of Neoathyreus with five to seven teeth on the fore tibia sometimes have the number vary by the addition

or loss of a small basal tooth, the four teeth mentioned in the original description by Laporte (1840) and illustrated by Westwood (1851) were treated by many early workers such as Bates (1887) simply as varietal variation. However the male genitalia of excavatus are distinct and the teeth on the fore tibia do not exceed four in number (abraded specimens may seem to have three).

The species excavatus, while related to a number of brown species with similar non-angulate inner pronotal carinae and short, arcuate outer carinae such as lanuginosus (Klug), can usually be distinguished by the following combination of characters: clypeus with oblique carina on each side extending to small median tubercle, tubercle anterior in position to poorly developed lateral tubercles; vertex nearly flat, uniformly granulate; anterior pronotal margin with small tubercles on midline; pronotal concavity shallow, relatively evenly concave; inner carina on each side low, arcuate around concavity; lateral margin of pronotum below fovea indented, marginal bead broken; elytron with most of surface granulate-setose; fore tibia with four teeth on outer margin.

Neoathyreus excavatus ranges from Mexico (see quadridentatus Howden, 1964) to northern South America and along the Andes. I have not seen specimens of excavatus with accurate data from central or southern Brazil, Argentina, or Paraguay.

Little is known of the habits of excavatus. A few specimens have been personally collected just at dusk flying to light and two specimens were dug from shallow burrows. The burrows were found near Santiago in northeastern Colombia where some road fill had been dug from a partly forested hillside. The flat, disturbed area in which the two burrows were found was sparsely covered with a foot high growth of forbs and grasses. The soil was heavy with a high clay content and some humus.

A specimen from Colombia (in London) is labeled "Valle del Cauca, Cali, 11.I.72, dug from 2 ft. burrows, Mitchner".

27. Neoathyreus lanei (Martínez)

Figures 89-91, Map 6

Athyreus lanei Martínez, 1952, p. 110; Howden 1964, p. 16.

TYPE. Male, labeled "Venezuela, D.F., Cerro del Naiguatá, 720 m., VII. 43, Rene Lichy-leg." in Martínez collection.

MALES. Length 7.6 to 10.4 mm, greatest width 4.7 to 6.8 mm. Dorsally uniformly very dark brownish-black to black. Clypeus trituberculate; tubercles small, median tubercle anterior in position and slightly higher than lateral tubercles; clypeus anteriorly with transverse carina, oblique carinae lacking; posterior carina extending between tubercles well developed. Vertex flat or nearly so, uniformly granulate-punctate. Pronotum (Fig. 89) with fossa on each side very small, shallow; anterior margin medially with small tubercle; pronotum posterior to margin behind head shallowly concave, concavity limited by inner carina on each side and posteriorly by smooth, transverse area. Inner pronotal carina on each side low, moderately wide, feebly arcuate, converging to top of concavity delimited by smooth area, then parallel posteriorly to termination. Outer pronotal carina 1.0 to 1.3 mm long, arcuate, almost equidistant in position between inner carina and inwardly arcuate lateral margin just before posterior pronotal angle. Lateral fovea small with smooth groove extending

down to indented lateral margin; marginal bead absent in indentation. Elytron with one to three striae vaguely indicated basally, elytral surface rough, rugose punctate-setose, only humeral umbone smooth and shining. Metasternum between middle coxae very slightly convex, anterior edge broadly obtuse, angle prominent. Metasternal midline with fine indentation; metasternal surface with widely separated, small, setose punctures. Fore tibia with four teeth on outer margin. Genitalia as in figs. 90, 91.

FEMALES. Length 7.9 to 10.8 mm, greatest width 5.2 to 6.9 mm. No consistent external differences are evident except that the pygidium is more rounded apically than in males.

MATERIAL EXAMINED. 143 males, 22 females.

COLOMBIA - 1, no other data. Bogotá. Magdalena: Aracataca; Río Frió. Santander del Norte: La Playa, VI.

TRINIDAD - Arima Valley, 500 to 1200 ft., III. Simla. Tacarigua, XI.

VENEZUELA - 1, no other data. Carabobo: Las Trincheras, 900 m; 1000 m, V. Caracas. Cumanacoa. Los Canales. Tachira: Barrio El Lobo, X. Yaracuy: Dist. Nirgua, Caserío San Mateo, 900 m, VI.

Specimens are in: Berlin, Brussels, Cambridge, Dresden, London, Maracay, New York, Paris, San Francisco, São Paulo, Washington, Arnaud, Howden.

REMARKS. Neoathyreus lanei occurs from Trinidad across northern Venezuela and Colombia to central Panama. Specimens from Venezuela (type locality) have the finger-like apical lobe of the male genitalia stouter and somewhat shorter than specimens from either Trinidad or Panama. In addition Panamanian specimens have conspicuous erect setae on the elytra. None of these few differences seem entirely consistent and I can only conclude that the differences noted represent variation within one species.

The species, lanei, as defined here can be recognized by the following combination of characters: black or very dark brownish-black color; anterior transverse clypeal carina; small median tubercle on anterior pronotal margin; low, moderately wide, feebly arcuate inner pronotal carina surrounding shallow concavity; outer pronotal carina arcuate, positioned midway between inner carina and pronotal margin; lateral pronotal margin indented and with marginal bead broken; elytra rugose-punctate; fore tibia with four teeth on outer margin.

None of the related small, dark brown to black species such as fossulatus have the indented lateral pronotal margin with the marginal bead broken. If brown teneral specimens of lanei are found it will probably be necessary to check the male genitalia for accurate determination.

Specimens in Trinidad were taken at a kitchen light, while a large series was taken on Barro Colorado Island, Panama, in flight interception traps. A single specimen was dug from a burrow in an unused clay road fill area 3 km N. of Chinácota, Colombia (see description of area under lanuginosus). The available evidence indicates that the species is crepuscular.

28. Neoathyreus obscurus n. sp.

Figures 92-94, Map 6

HOLOTYPE. Male, length 10.1 mm, greatest width 6.1 mm. Dorsally brownish black with labrum, clypeus and most of lateral fourths of pronotum reddish brown; area of pronotal foveae dark brown. Clypeus with anterior

and posterior transverse carinae distinct; median tubercle moderately developed, slightly higher and anterior in position to lateral tubercle on each side. Vertex almost flat between eyes; surface granular, each granule with long, erect, pale seta at base; midline of posterior half of vertex smooth, slightly raised. Pronotum (Fig. 92) with small fossa on each side contiguous with anterior marginal bead,approximately equal in width to width of adjacent bead; pronotal margin between fossae moderately elevated to small, conical tubercle at midline on posterior edge of marginal bead. Inner carina on each side very slightly sinuate, almost straight and nearly uniform in thickness; inner carina most widely separated from opposite carina anteriorly, carinae gradually converging to posterior ends near posterior pronotal margin; pronotal concavity between carinae shallow, surface granular except posterior fourth smooth to within 1.2 mm of posterior pronotal margin, smooth area forming band between inner carinae. Outer pronotal carina on each side present only posteriorly, approximately 1.3 mm long with posterior end briefly curved; outer carina closer in position to lateral pronotal margin anterior to posterior angle than to inner carina. Pronotum laterally with fovea distinct, slightly elongate, lacking any trace of carina near anterior edge; pronotal margin below fovea feebly indented, marginal bead very slightly reduced, not broken. Elytron lacking distinct striae on disc, surface irregular, with numerous coarse granules, most with small setose puncture at base; surface of elytron mostly shining. Metasternum between middle coxae feebly convex, anterior edge broadly, obtusely angulate, apex keeled; surface of metasternum with numerous large, shallow setose punctures; midline slightly elevated, impunctate. Fore tibia with four distinct teeth on outer margin, basal fifth tooth indicated by feeble swelling (not considered a tooth but indicative that a fifth tooth could be present in some specimens). Genitalia as in figs. 93, 94.

ALLOTYPE. Female, length 9.8 mm, greatest width 6.4 mm. Dorsally very dark brown with only narrow band along lateral edges of pronotum light reddish brown. Similar to holotype except as follows: median clypeal tubercle lower, approximately equal in height to lateral tubercles; pronotum laterally below fovea slightly indented, marginal bead briefly broken; fore tibia with basal fifth tooth very feebly indicated; pygidium with apex more broadly rounded.

TYPE MATERIAL: Holotype, male, Brazil, Etat de Goyas, Jatahy, Ch. Pujol 1895-96 (Paris). Allotype, female, Brazil, Goyas, Rio Verde, Coll. C. Felsche, Kaul 20, 1918 (Dresden).

PARATYPES: 1 male, 1 female. 1, same data as allotype.

BRAZIL - 1, Mato Grosso: Gleba Arinos, 350 m, 7.XI.1967, leg. Viehmann.

Paratypes are in: Dresden, Howden.

REMARKS. This species has no uniquely distinctive single feature with the possible exception of the male genitalia. The one female paratype is 9.1 mm long but otherwise is similar to the allotype. The male paratype has a small basal fifth tooth on the fore tibia, but does not differ in other characters. Neoathyreus obscurus appears to be most closely related to lanei from which it differs in color, in having the pronotal marginal bead unbroken to briefly interrupted below the fovea and in slight differences in the clypeal and pronotal carinae. If uniformly dark obscurus occur (I suspect they may), examination of the male genitalia may be necessary to separate obscurus from lanei. In most specimens of lanei the lateral pronotal marginal indentation below the fovea is much more pronounced than in obscurus. Specimens of obscurus with a fifth tooth on the fore tibia will

key to inermis, but that species has seven or more teeth on the fore tibia and the male genitalia is very different.

29. Neoathyreus ornatus n. sp.

Figures 95-97, Map 6

HOLOTYPE. Male, length 13.1 mm, greatest width 7.4 mm. Dorsally light reddish-brown. Clypeus lacking any vestige of anterior carina, only posterior carina present, moderately developed; median tubercle over twice height of lateral tubercle, positioned near longitudinal center of clypeus; lateral tubercle on each side above antennal insertion feebly developed. Vertex with carina on each side at inside margin of eye, extending posteriorly about 0.3 mm, uniform in height with abruptly declivous, rounded end; vertex between carinae very shallowly concave, surface granulate-punctate, most punctures each with short, fine, pale seta. Antennal club atypical for genus, strongly oval; terminal segment with length to width ratio of 4.5:4. Pronotum (Fig. 95) with small fossa on each side adjacent to anterior margin behind eye; fossa two to three times width of adjacent marginal bead; pronotal margin between fossae feebly elevated to midline, small conical tubercle present at midline at posterior edge of marginal bead. Inner pronotal carina on each side proportionately unusually long for genus, extending from approximately 0.4 mm behind anterior fossa to 0.1 mm from edge of posterior marginal bead; carina stout, with vague inward angulation or sinuation near middle; carina gradually converging toward opposite carina, posterior ends separated by approximately 1.2 mm; concavity between unusually elongate, deepest near middle of pronotum; surface irregularly granulate to punctate, seta minute; midline shallowly impressed in posterior fourth. Outer pronotal carina on each side in two parts, short, narrow portion present just anterior to shallow lateral fovea; posterior section approximately 1.8 mm long and about 0.3 mm wide at widest point; posterior portion of carina positioned midway between inner carina and lateral pronotal margin just anterior to posterior angle. Lateral pronotal margin below shallow lateral fovea minutely indented, bead slightly reduced but not broken. Elytron with five or six striae represented by irregular rows of minute punctures; intervals with a few scattered punctures, much of surface lacking granules or punctures, slightly roughened, alutaceous; disc with only minute setae, longer, semi-erect setae present posteriorly and laterally. Metasternum between middle coxae feebly convex, anterior edge obtusely angulate, apex of angulation blunt; surface of metasternum with very small, scattered punctures, each with moderately long, fine seta. Fore tibia with four very broad, short teeth on outer margin. Genitalia as in figs. 96, 97.

FEMALE. Unknown.

TYPE MATERIAL: Holotype, male, Peru, Callao, Walker; G.C. Champion coll., B.M. 1927-409 (London). Paratype, male, Peru, Callao, 12 Jan. 19 (Howden).

REMARKS. The single male paratype is smaller than the holotype, measuring 11.2 mm in length and 6.5 mm in greatest width. Dorsal color is reddish brown. The median clypeal tubercle is reduced in height, a function of smaller size. The lateral pronotal margin below the lateral fovea is slightly more indented in the paratype and the anterior portion of the outer carina is greatly reduced in development. The paratype also has a very feebly developed obtuse swelling at the base of the outer margin of the

fore tibia, the swelling indicating that a fifth tooth might occasionally be evident if more specimens are found.

Neoathyreus ornatus is one of the more unusual species in the genus. It has a number of unusual characters and the combination of the oddly oval antennal club, lack of an anterior clypeal carina, very elongate pronotal concavity, and inconspicuous dorsal seta, readily identify the species. The west coast locality in Peru is also unusual. I have trouble relating this species based on synapomorphies, but it is perhaps closest to acutus.

30. Neoathyreus caesariatus n. sp.

Figures 98-100, Map 6

HOLOTYPE. Male, length 16.0 mm, greatest width 9.3 mm. Dorsally brown to dark brown. Clypeus with anterior oblique carina on each side feebly developed, posterior transverse carina strongly developed; median tubercle prominent but with sides not abruptly elevated above transverse carina; anterior face of median tubercle amost vertical, slightly posteriorly inclined near base; lateral clypeal tubercle on each side not prominent, obtusely angled. Vertex moderately convex, evenly, closely granulate, each granule with erect tan seta at base. Pronotum (Fig. 98) with small fossa on each side contiguous with anterior marginal bead behind eye, fossa equal in width to width of adjacent bead; pronotal margin between fossae elevated to feeble, rounded tubercle on marginal bead at midline, bead punctate on either side of tubercle. Inner pronotal carina on each side arising approximately 1.0 mm behind fossa, carina slender, feebly elevated, flared slightly outwardly to abrupt inward projection extending as broad, flattened area to midline, posterior edge of carina at inward bend approximately 0.6 mm from posterior pronotal margin; flattened posterior band of carina narrowed at midline but not interrupted. Pronotal concavity with small, deep oval concavity just posterior to anterior pronotal margin; anterior end of inner carina on each side arising near transverse mid-point of concavity; midline posterior to oval concavity moderately depressed, surface on each side sloping gradually upward to inner carina on each side. Outer pronotal carina on each side atypical for genus, anterior section feebly represented by fine, tenuous ridge 0.4 mm long just anterior to lateral fovea; posterior portion of outer carina more pronounced, posterior end fusing with inner carina at abrupt inward bend, thus appearing as lateral branch of posterior part of inner carina. Pronotum laterally with shallow fovea, lateral margin below fovea not indented, bead complete. Elytron with one or two striae vaguely indicated, disc of elytron irregularly granulate to rugose, each depression (irregular puncture) with semi-erect seta. Metasternum between middle coxae almost flat, midline indicated by faint groove, anterior edge obtusely angulate, apex of angle at midline with small keel; surface of metasternum with scattered shallow punctures, each with erect, fine seta. Fore tibia with four teeth on outer margin. Genitalia as in figs. 99, 100.

ALLOTYPE. Female, length 11.5 mm, greatest width 6.8 mm. Dorsally brownish-black. Similar to holotype except as follows: clypeus with both oblique and posterior transverse carinae equally, strongly developed; median and lateral clypeal tubercles greatly reduced in height, median tubercle positioned near mid-point of clypeus; pronotal concavity reduced in area, deepest at midline with sloping sides, more elongate in shape; inner and posterior sections of outer carinae slightly wider; elytron with six

distinct striae between suture and humeral umbone, intervals mostly impunctate, shining; elytral striae irregularly punctate; pygidium with broader, more rounded apex.

TYPE MATERIAL: Holotype, male, [Brazil], Pará (Howden). Allotype, female, São Paulo, Theophilo Ottoni, A. Richter Leg., 1930 (São Paulo).

PARATYPES: 4 males, 9 females.

BRAZIL - 11, no other data; 1, Rio, 10-44 on green circular label; 1, Rio Jan.

Paratypes are in: Berlin, Brussels, London, Oxford, Paris, Howden.

REMARKS. The holotype and allotype represent the approximate extremes in size and development. Several teneral specimens are light tan in color while a few worn (= old?) specimens are mostly black dorsally. The holotype is missing one antennal club and parts of all tarsi. It was selected as it was the only major male with any data other than "Brazil" that I have available. The same is true of the allotype.

The species is easily recognized by the odd fusion of the posterior end of each outer carina with the adjacent portion of the inner carina. This character will easily separate caesariatus from the closely related tridentatus and politus.

31. Neoathyreus illotus n. sp.

Figures 101-103, Map 6

HOLOTYPE. Male, length 8.8 mm, greatest width 5.5 mm. Dorsally very dark reddish brown. Clypeus with anterior oblique carina indistinct except near anterior angles; posterior transverse carina distinct, low; median tubercle small, poorly developed, slightly lower than lateral tubercle on each side. Vertex slightly tumid between eyes, surface closely, coarsely punctate except less so on median tumid area; many punctures with small granule at anterior edge; each puncture with fine, erect, tan seta. Pronotum (Fig. 101) anteriorly with small fossa on each side contiguous with anterior marginal bead; width of fossa approximately equal to width of adjacent bead; anterior pronotal margin between fossae gradually elevated to midline, marginal bead at midline briefly thickened but distinct tubercle lacking. Inner pronotal carina stout, most widely separated from midline anteriorly, approaching midline and becoming parallel posteriorly; pronotal concavity shallow, deepest in anterior fourth of pronotum; concavity between anterior portions of inner carinae with wide, smooth impunctate transverse band merging with carinae, concavity anterior to band granulate or rugose; posterior to band pronotum depressed between inner carinae with midline forming smooth indentation to posterior margin. Pronotum with outer carina on each side divided into two sections; anterior section slender, at right angles to lateral margin, extending from 0.1 mm above margin inwardly just anterior to fovea for approximately 1.5 mm; posterior section of carina three to four times width of anterior section and of almost equal length; posterior section positioned midway between inner carina and lateral margin just anterior to posterior pronotal angle. Pronotum laterally with oval fovea, margin below fovea slightly inwardly arcuate, marginal bead complete, not reduced. Elytron with two or three vague striae, surface of disc closely, coarsely punctate, each puncture with slender, erect or semi-erect seta;

surface between punctures shining. Metasternum between middle coxae almost flat with slightly raised midline, anterior edge obtusely angulate with angle at midline with small, acutely pointed tubercle; surface of metasternum with scattered, shallow punctures, each puncture with long, fine seta. Fore tibia with four teeth on outer margin. Genitalia as in figs. 102, 103.

ALLOTYPE. Female, length 8.7 mm, greatest width 5.7 mm. Similar to holotype except as follows: clypeal tubercles reduced in size and height, median tubercle slightly higher than either lateral tubercle; anterior portion of outer carina shortened, approximately 0.7 mm in length, anterior in position to lateral fovea; apex of pygidium more rounded.

TYPE MATERIAL: Holotype, male, Guyana, Bartica, 30.VIII.1973, K. Neil (Howden). Allotype, female, Guyane française, collect. C. Bar. (Paris).

PARATYPES: 3 males, 3 females. 2, same data as allotype.

BRAZIL - 1, Amazonas, Manaus, 1.III.1978, B.C. Ratcliffe.

FRENCH GUIANA - 2, Cayenne; 1, Cayenne, La Chaumière, IV.1979, P. Arnaud.

Paratypes are in: London, Paris, Howden.

REMARKS. In the type series the holotype is the largest specimen and the smallest is a male measuring 7.5 mm in length and 5.1 mm in greatest width. Variation in the series is slight, the major differences being those noted between the holotype and allotype. The smallest specimen has the pronotal concavity shallower than in larger specimens, a type of size-related variation common throughout the genus. Neoathyreus illotus is most closely related to the anthracinus-latidorsalis group of species but differs from these by lacking a tubercle on the midline of the anterior pronotal margin. Based entirely on external characters illotus is most likely to be confused with lanei but differs from that species by not having the lateral pronotal margin sharply indented and the bead broken. The male genitalia of illotus are very different from those of lanei.

32. Neoathyreus versicolor n. sp.

Figures 104-106, Map 6

HOLOTYPE. Male, length 8.4 mm, greatest width 5.0 mm. Color dorsally mixed tan, brown and black; labrum, clypeus and vertex except posterior edge tan, posterior edge and genae brownish-black or black; pronotum with area surrounded by inner carinae, carinae and narrow contiguous band adjacent to carinae along with posterior pronotal marginal area black; outer thirds of pronotum along with outer carinae tan; scutellum black; elytron with umbone tan, remainder of surface moderately uniform brown. Clypeus with very feebly indicated oblique carina, posterior transverse carina evident but poorly developed; median and lateral tubercles very small, median tubercle slightly higher than lateral tubercle on each side. Vertex flat between eyes, surface closely, coarsely punctate, each puncture with long, erect, pale seta. Pronotum (Fig. 104) with small fossa on each side contiguous with anterior marginal bead behind eye, fossa slightly wider than adjacent bead; pronotal margin between fossae arcuately elevated to midline, posterior edge of marginal bead at midline with minute conical tubercle. Inner pronotal carina on each side low, widest anteriorly, gradually becoming narrower posteriorly; inner carina separated from opposite carina anteriorly by approximately 1.5 mm, then gradually converging posteriorly, posterior

ends separated by approximately 0.6 mm, inner carina very slightly sinuate or curved. Pronotal concavity very shallow, indistinct, present only in anterior half of pronotum between inner carinae; surface of concavity and other pronotal surface, except for carinae and foveae, coarsely, closely punctate, each puncture with erect tan seta. Outer pronotal carina on each side arcuate, low, approximately 1.0 mm long; only present posteriorly, positioned midway between inner carina and posterior pronotal margin just anterior to posterior angle. Pronotum laterally with relatively deep oval fovea, pronotal margin below fovea slightly indented, marginal bead complete, not reduced. Elytron with four or five feebly impressed striae on disc, surface of elytron coarsely, closely, irregularly punctate, each puncture with erect dark brown seta, surface between punctures shining. Metasternum between middle coxae feebly convex, anterior edge obtusely angled, apex of angle at midline with small keel; surface of metasternum with scattered shallow punctures each with elongate, semi-erect seta. Fore tibia with four teeth on outer margin. Genitalia as in figs. 105, 106.

FEMALE. Unknown.

TYPE MATERIAL: Holotype, male, Equateur, Loja, Abbé Gaujon (Paris).

REMARKS. This species is related to illotus but differs in color, lacks the smooth, transverse band at the posterior edge of the pronotal concavity and differs in the characters of the male genitalia. The small size and variegated dorsal color will separate versicolor from other species of Neoathyreus. It is possible that some specimens may be more uniformly dark in color, but the other characters should still distinguish the species.

33. Neoathyreus martinezorum n. sp.

Figures 107-109, Map 7

HOLOTYPE. Male, length 13.9 mm, greatest width 9.2 mm. Dorsally light brown. Clypeus with anterior oblique carina incomplete, absent near midline; posterior transverse carina strongly developed, median tubercle distinctly more elevated than small lateral tubercle on each side, median tubercle only slightly anterior in position to transverse line between lateral tubercles. Vertex flat to very slightly concave between eyes, surface with numerous relatively small granules, each granule with erect, pale seta at base. Pronotum (Fig. 107) with relatively large fossa on each side adjacent to anterior marginal bead behind eye, fossa deep, with width three to four times width of adjacent bead; anterior margin between fossae elevated to moderate-sized, conical tubercle at midline. Inner pronotal carina on each side with anterior end beginning approximately 1.3 mm behind and outside of fossa, carina rising almost vertically to acute, upright angle above line of lateral foveae, carina then abruptly reduced in height, curved inward to posterior margin of concavity, then becoming parallel with midline to posterior end 0.3 mm before posterior pronotal margin; inner carinae unusually widely separated by approximately 5.1 mm, carinae posterior to concavity separated by approximately 2.0 mm; concavity wide and shallow, deepest medially about 1.1 mm behind anterior median pronotal tubercle; surface of concavity with numerous small granules, each with fine seta at base; midline and wide transverse band at posterior edge of concavity smooth, opaque. Outer pronotal carina on each side approximately 2.0 mm long, feebly arcuate, only posterior portion present, positioned midway between inner

carina and adjacent, inwardly arcuate pronotal margin just anterior to posterior angle. Pronotum laterally with deep, elongate fovea, elongate groove perpendicular to strongly indented lateral margin, marginal bead absent in indentation. Elytron with two or three vague striae near base of disc, surface of disc with numerous, moderate-sized punctures, each with erect or semi-erect dark brown or black seta; surface between punctures shining. Metasternum between middle coxae feebly convex, primarily along midline; anterior edge of metasternum obtusely angulate, angle at midline with small keel; surface of metasternum with numerous shallow punctures, each with anterior granule and central, erect pale seta. Fore tibia with six teeth on outer margin, basal tooth minute. Genitalia as in figs. 108, 109.

ALLOTYPE. Female, length 13.7 mm, greatest width 9.8 mm. Similar to holotype except as follows: anterior clypeal carina less oblique, joined across midline by faint arcuate ridge to opposite side, thus carina might be considered as transverse; posterior transverse clypeal carina and median tubercle lower but otherwise similar; pronotum with lateral marginal indentation slightly shallower; apex of pygidium more rounded.

TYPE MATERIAL: Holotype, male, Argentina, Jujuy, Yuto, 19.I. 1965, L. Stange (Tucumán). Allotype, female, Argentina, Jujuy, 6 km W. Yuto, INTA, 13-14.II.1982, H. & A. Howden (Howden).

PARATYPES: 1 male, same data as allotype.

BOLIVIA - 1 female, Dp. Santa Cruz: Pica Cordillera, Tararenda, XII.1960, Martínez.

Paratypes are in: Howden.

REMARKS. Other specimens of this species are in the Martínez collection. Unfortunately the specimens were seen before the study was started and I have not been able to re-examine them.

The two paratypes do not vary significantly from the description of the type of the same sex. The large size, unusually wide (5.0 mm), shallow pronotal concavity, and the anteriorly, vertically angulate inner carinae are characters that usually will distinguish the species. The most closely related species is probably lepidus but the pronotal carinae of the two species differ radically.

The species is named in honor of Antonio and Juana Martínez, who were wonderfully hospitable during our 1982 visit to Argentina and who were with me at Yuto when I collected the species at light.

34. Neoathyreus latecavatus (Boucomont)

Figures 110-112, Map 7

Athyreus latecavatus Boucomont, 1932, p. 263.

TYPE. Female, labeled "Athyreus latecavatus sp. n.; Sosomoco, Ost. Columb.; typus [red label]; Museum Paris 1938 Coll. A. Boucomont"; in Paris.

MALES. Length 13.2 to 15.5 mm, greatest width 7.0 to 7.8 mm. Dorsally very dark brown. Clypeus with irregular anterior transverse carina and strongly developed posterior carina, oblique carina absent; median tubercle slightly anterior and slightly higher than lateral tubercle on each side, clypeal face below posterior carina strongly declivous in large males. Vertex between eyes flat to feebly convex, surface closely granulate, bases of most granules each with erect tan seta. Pronotum (Fig. 110) with moderate sized fossa on each side contiguous with anterior marginal bead

behind eye, fossa two to three times width of adjacent bead; pronotal margin between fossae with small, rounded tubercle on midline. Inner pronotal carina in large specimens arising approximately 0.8 to 0.9 mm behind fossa on each side, carina not strongly elevated, slightly widened and vaguely angulate near middle, first two thirds of carina nearly parallel with midline, then curved inwardly to within 0.6 mm of midline, where carina becomes nearly parallel with midline, ending approximately 0.5 or 0.6 mm before posterior margin; in small males the carina is almost evenly convergent towards the posterior and the carina is of uniform thickness and height; pronotal concavity deepest anteriorly and along midline, concavity granulate in anterior three-fourths, smooth in posterior fourth with posterior edge between carinae sharply delimited. Outer carina on each side moderately arcuate, approximately 1.5 mm long, positioned midway between inner carina and inward arcuate margin of posterior pronotal angle; pronotal fovea on each side elongate, extending toward margin, lateral margin below fovea briefly indented, marginal bead interrupted. Elytron with three or four striae briefly, feebly developed basally, disc regularly, closely granulate, posterior base of each puncture with semi-erect tan seta. Metasternum between middle coxae feebly convex, anterior edge at midline bluntly, broadly, obtusely angled, midline anteriorly occasionally feebly indented; metasternal surface with numerous shallow, coarse punctures, each with long tan seta. Fore tibia with five teeth on outer margin. Genitalia as in figs. 111, 112.

FEMALES. Length 14.5 to 15.2 mm, greatest width 8.6 to 9.0 mm. Except for more convex and rounded pygidium, females seen did not differ externally in any major way from large males.

MATERIAL EXAMINED: 2 males, 4 females.

COLOMBIA - Río Negro. Sosomoco (type). Villavicencio.

ECUADOR - Archidona. Macas.

Specimens are in: Paris, Berlin, Howden.

REMARKS. Specimens of latecavatus may be confused with large specimens of lanuginosus but differ in the shape of the pronotal carinae, which in latecavatus are not evenly arcuate; also mature specimens of latecavatus are dark brown and the four examples seen all have five teeth on the outer margin of the fore tibia.

35. Neoathyreus rufobrunneus n. sp.

Figures 113-115, Map 7

HOLOTYPE. Male, length 12.3 mm, greatest width 7.2 mm. Dorsally dark reddish brown. Clypeus with anterior transverse carina evident only near anterior lateral angles; posterior transverse carina strongly developed; median tubercle moderately developed, slightly higher and more anterior in position than lateral tubercle on each side. Vertex almost flat between eyes, surface coarsely, closely granulate; most granules each with long, tan seta arising from base. Pronotum (Fig. 113) anteriorly with small fossa on each side adjacent to anterior marginal bead behind eye; width of fossa approximately equal to width of adjacent bead; anterior pronotal margin between fossae feebly elevated to midline, midline with very small tubercle on bead. Inner carina on each side with feeble, inwardly directed, obtuse angulation near middle, carina slightly thicker posterior to angulation; carina arcuate at posterior end of concavity, then nearly straight to termination 0.5 mm

anterior to posterior pronotal margin. Pronotal concavity longer than wide, deepest near anterior end at midline, then gradually reduced in depth to posterior end; surface of concavity granulate-punctate, most punctures each with tan seta, midline and posterior edge of concavity almost impunctate, smooth, opaque. Outer pronotal carina present only posteriorly, carina thin, approximately 1.0 mm long, positioned midway between inner carina and lateral pronotal margin just anterior to posterior angle. Lateral pronotal fovea on each side elongate, extending as groove to margin, margin below fovea deeply indented, marginal bead absent in indentation. Elytron with several strial indentations near extreme base of disc, surface of disc otherwise even and closely, irregularly punctate, giving rugose appearance; punctures each with almost erect, tan seta. Metasternum between middle coxae feebly convex, anterior edge obtusely angulate with angle at midline with small, sharp, anteriorly directed tubercle; surface of metasternum with evenly spaced, shallow punctures, each with erect, moderately long, pale seta. Fore tibia with five teeth on outer margin. Genitalia as in figs. 114, 115.

ALLOTYPE. Female, length 12.1 mm, greatest width 7.2 mm. Dorsally brownish black. Similar to holotype except as follows: anterior transverse clypeal carina more pronounced, absent in median third; median clypeal tubercle slightly lower, inner pronotal carina slightly more strongly angulate; pronotal concavity wider, with granulate-punctate area reduced; pygidium with apex more broadly rounded.

TYPE MATERIAL: Holotype, male, Peru, Tingo María, 19.IX.1960, J. Schunke (Howden). Allotype, female, Ecuador, Mera, 25.I.1923, F.X. Williams (London).

PARATYPES: 1 male, 2 females, 1, N. Grenada, (B.M.#) 67.45, and 27; 2, same data as allotype.

Paratypes are in: London, Howden.

REMARKS. The male paratype is the smallest specimen seen, measuring 10.3 mm in length and 6.8 mm in greatest width. It also differs in having the basal fifth tooth on the outer margin of the fore tibia obsolete. Otherwise the variation noted is mainly sexual and is described under the allotype. All three females have the pronotal concavity wider, particularly posteriorly, than in the males.

Neoathyreus rufobrunneus is probably most closely related to brazilensis, from which it differs mainly in having the sides of the pronotum below the foveae indented and the marginal bead broken. Also the genitalia of rufobrunneus is very distinctive.

36. Neoathyreus perryae n. sp.

Figures 116-119, Map 7

HOLOTYPE. Male, length 11.4 mm, greatest width 8.0 mm. Dorsally light brown. Clypeus with oblique carina strongly developed except at anterior base of median tubercle near midline, carina slightly irregular in median area; posterior transverse clypeal carina strongly developed and elevated to apex of median tubercle; median tubercle not isolated from carina, moderately higher than lateral tubercle on each side; each lateral tubercle slightly elevated above level of carina. Vertex between eyes feebly concave, surface with small granules, most separated from adjacent granules by one or two granule diameters. Pronotum (Fig. 116) with moderate sized fossa on each side adjacent to anterior marginal bead behind eye; fossa approximately

three times as wide as width of adjacent bead; anterior pronotal margin between fossae moderately elevated to small, conical tubercle at midline. Inner pronotal carina on each side enclosing concavity approximately as wide as head (measured from outer edge of genae) at widest point; carina not varying greatly in height, sinuous, curving toward midline posteriorly, paralleling midline posteriorly behind concavity; each inner carina 0.5 mm from anterior end with carinate branch extending laterally to just anterior of lateral fovea; laterally directed carina not sharply defined, sides of carina irregularly punctate or granulate, carina becoming feeble to obsolete just above and anterior to fovea, not extending to lateral margin. Pronotal concavity broad, relatively evenly concave, midline impressed at bottom of concavity and posteriorly, surface of concavity granulate or punctate, granulate area with minute setae; surface of posterior fourth of concavity smooth, opaque. Outer carina present only posteriorly above and just anterior to posterior pronotal margin, carina closer to inner carina than to margin; outer carina unusually thickened and with wide impunctate area extending inward to inner carina. Pronotum laterally with elongate fovea, lateral margin below fovea moderately indented, marginal bead absent in indentation. Elytron lacking striae on disc, surface of disc closely punctate, most punctures separated from others by one to two diameters, most punctures each with fine, semi-erect, pale seta, surface between punctures finely alutaceous. Metasternum between middle coxae moderately convex, midline slightly elevated, anterior edge obtusely angled, apex of angle slightly keeled; surface of metasternum with numerous large, shallow punctures, each with long, fine, semi-erect seta. Fore tibia with seven teeth on outer margin, basal teeth small, acute. Genitalia as in figs. 118, 119.

ALLOTYPE. Female, length 11.1 mm, greatest width 6.9 mm. Similar to holotype except as follows: anterior clypeal carina obsolete medially; posterior clypeal carina and associated tubercles lower, less well developed; width of pronotal concavity slightly less than width of head; inner pronotal carina lacking lateral branch; outer carina not as thickened, positioned midway between inner carina and adjacent margin; area between inner and outer carina punctate; elytral disc with several striae feebly indicated; apex of pygidium very slightly, more broadly, rounded.

TYPE MATERIAL: Holotype, male, Ecuador, Posorja, F. Campos R. (Washington). Allotype, female, same data as holotype (Washington).

PARATYPES: 5 males, 4 females.

ECUADOR - 2, no other data; 2, same data as holotype; 2, Balao; 1, S.W. Ecuador, in garden, R. Wright Barker, B.M. 1935-559.

PERU - 1, Ascope; 1 (pronotum only), fossil from Talara tar seeps, about 14,000 years old, TOM #74D4.

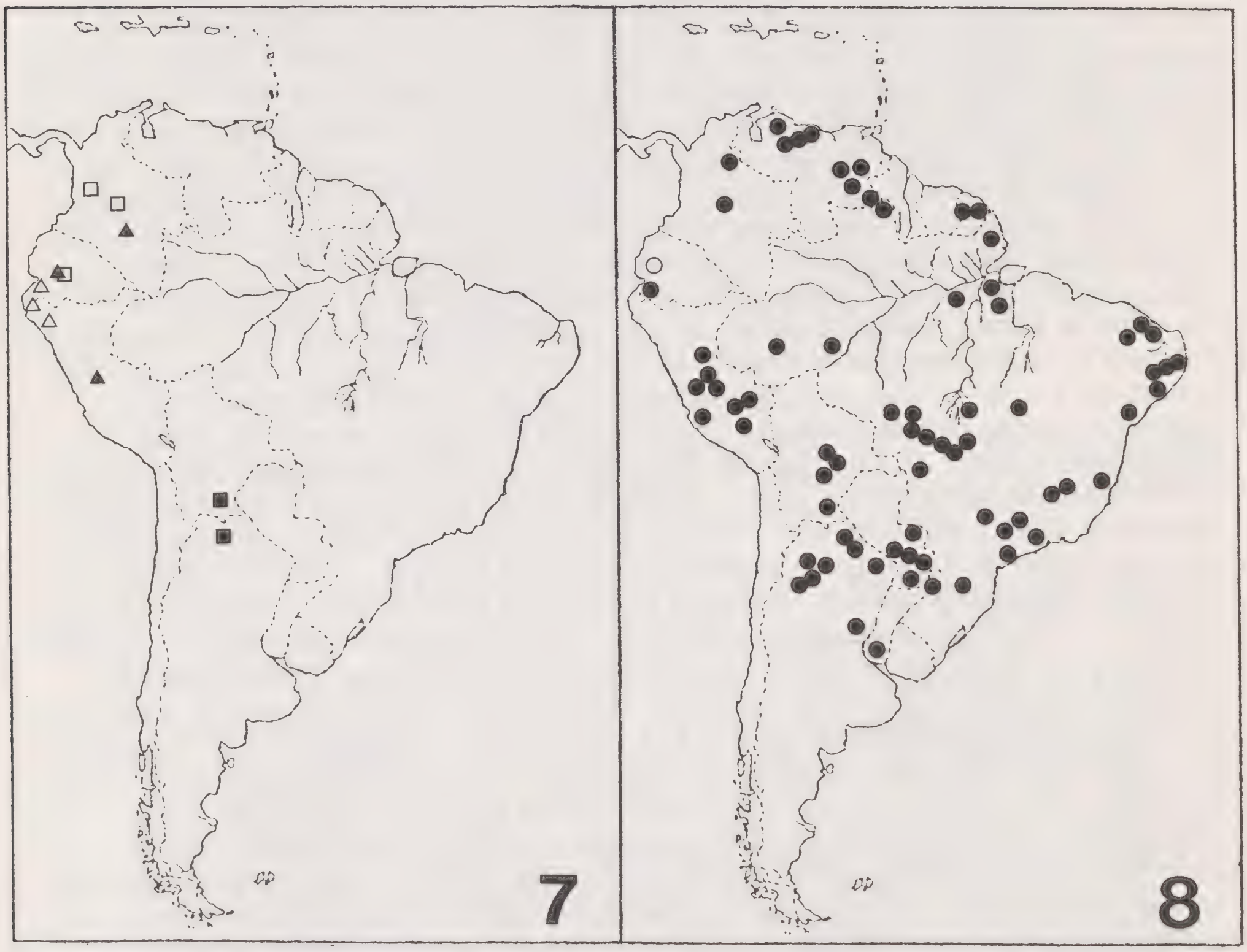
Paratypes are in: Dresden, London, Paris, Toronto, Washington, Howden.

REMARKS. The largest specimen in the type series, a male, measures 13.2 mm in length and 8.5 mm in greatest width; the smallest specimen, a female, measures 9.4 mm in length and 6.8 mm in greatest width. The most interesting variation noted in the series is the absence of the lateral branch of the inner pronotal carina in females and in one small male. In other species having a lateral branch there is little variation in the character regardless of sex or size. In several males of perryae the smooth, nongranulate band between the inner and outer carinae is reduced or absent. Dorsal color also varies from tan to very dark brown. Other differences are mentioned under the description of the allotype.

Neoathyreus perryae is probably most closely related to lanuginosus. It can be distinguished from that species by the shape of the wide, shallow pronotal concavity and the pronotal carinae.

The fossil pronotum (Fig. 117) from the Talara tar seeps of Peru matches almost exactly the pronotum of the male from S.W. Ecuador. The site of the tar seeps on the coast of Peru has been described by Churcher (1966), but since extant specimens are recorded both to the north and south of Talara on the western side of the Andes, no inferences can be made on any major range shifts or habitat changes.

The species is named in honor of Mrs. Betty Perry in recognition and appreciation of the many years that she has assisted me with the typing and preparation of manuscripts.



■ = 33. martinezorum n. sp.
□ = 34. latecavatus (Boucomont)
▲ = 35. rufobrunneus n. sp.
△ = 36. perryae n. sp.
● = 37. lanuginosus (Klug)
○ = 38. lyriferus Howden & Gill

37. Neoathyreus lanuginosus (Klug)

Figures 2, 6, 120-122, Map 8

Athyreus lanuginosus Klug, 1843, p. 28; Harold, 1880, p. 45; Bates, 1887, p. 110.

Lectotype here designated. Female, labeled "Nov. Valencia, Moritz [green label]; Klug*; Typus [red label]"; and my lectotype label; in Berlin.

The second specimen from "Nov. Val. Mor. Bahia" mentioned by Klug is now imperfect. Klug clearly states "six teeth on the fore tibia", but the head and pronotum are those of excavatus Laporte with four teeth on the fore tibia, while the remainder of the (glued together) specimen is a male which is conspecific with the female designated as lectotype.

MALES. Length 8.7 to 13.2 mm, greatest width 5.8 to 8.2 mm. Dorsally uniform light tan to brown. Clypeus lacking oblique carina, with anterior transverse carina interrupted or irregular at midline; posterior carina pronounced, median tubercle merely raised, thickened median portion of obtusely angled carina; lateral tubercles on each side poorly developed, lower than median tubercle. Vertex almost flat, very slightly, broadly concave between eyes, surface moderately granulate, sometimes less so near center of vertex. Pronotum (Fig. 120) with moderate sized fossa on each side behind eye, fossa contiguous with marginal bead and three to four times wider than bead; anterior pronotal marginal bead between fossae feebly widened and with small upright tubercle present at midline on posterior edge of bead. Inner pronotal carina on each side arising approximately 0.5 to 0.7 mm posterior to fossa, carina anteriorly separated from opposite carina by 4 mm or less (related to size of beetle), gradually converging toward opposite carina posteriorly, at posterior end of concavity being separated by 1 to 1.5 mm; carina not varying greatly in height or thickness, feebly arcuate anteriorly, nearly straight or feebly sinuous toward posterior, becoming nearly parallel with midline posterior to concavity, terminating approximately 0.5 mm from posterior pronotal margin. Pronotal concavity elongate, deepest medially, midline impressed or flattened, anterior two-thirds of concavity granulate, midline and posterior one-third largely smooth, smooth area reduced in small specimens. Outer pronotal carina present only near posterior pronotal angle, carina moderately to well developed, feebly arcuate, approximately 1.2 to 1.5 mm long, positioned slightly closer to pronotal margin than to inner carina, outer carina nearly parallel with adjacent inner carina. Lateral pronotal fovea narrow, frequently with indentation extending toward lateral margin; margin below fovea briefly indented except in some very small specimens, bead absent in indentation of larger specimens. Elytron occasionally with two or three vague striae indicated near basal margin, surface of disc uniformly closely granulate, each granule with minute setose puncture at posterior base, setae tan, of moderate length, inclined posteriorly. Mesosternum between middle coxae feebly convex, midline usually faintly impressed, anterior margin at midline sharply, broadly, obtusely angulate; mesosternal surface with well separated moderate sized punctures, each with long, semi-erect setae and frequently with minute granule at anterior edge of puncture. Fore tibia usually with six teeth on fore tibia; basal sixth tooth often absent, particularly in small or worn specimens, basal tooth rarely doubled so that fore tibia may occasionally have seven teeth. Genital capsule with setose, right-angled apex. Genitalia as in figs. 121, 122.

FEMALES. Length 8.7 to 12.7 mm, greatest width 5.6 to 8.1 mm. Very similar to males; clypeal and pronotal carinae usually slightly less developed in females when compared to males of similar size. Pygidium distinctly more convex and apex more rounded than in male.

MATERIAL EXAMINED: 141 males, 207 females.

ARGENTINA - Chaco: D'Icaño, Col. Benítez; Roque Sáenz Peña. Entre Ríos. Formosa: Laguna Blanca, I. La Rioja. Misiones: Magdalena, I. Salta: Gran Chaco; Río Tapenagá, XII. Santa Fe: Chaco de Santa Fe, Las Garzas; Río San Javier, Estancia la Nora, 13.XII.1911, 2.I.1912. Santiago del Estero: Río Salado, XI, XII. Tucumán: Concepción; Tucumán.

BOLIVIA - Santa Cruz: Buena Vista; El Cidral, I; Santa Cruz, 500 m, XII. Tarija: Tarija (II).

BRAZIL - 16, no other data. Alagoas: São Miguel dos Campos, IV. Amapá: Calçoene, VII; Tartarugalzinho, III. Amazonas: AM 010, km 268, IX; Rio Purus, Hyutanahã, II. Bahia: Lacerda; S. Antonio da Barra. Ceará: Barbalha, IV; Maceió; Russas, III. Espírito Santo: Timbuhy. Goiás: Jataí (= Jatahy); Vianópolis, XI. Mato Grosso: Chapada, IX; Cuiabá; Guaicurus, XI; Lagoa Santa, I; Pirapao, III; Rio Araguaia, Santo Teresinha, XI; Rio Verde, XI; Serra do Caraça, XII. Minas Gerais: Lambari, XI; Monte Alegre, II; Passa-Quatro; Sete Lagoas. Pará: Marco da Lagoa; Quellgebiet d. Xingu, Culiseu; Santarém. Paraná: Ponta Grossa, II. Pernambuco: Periperi. Roraimã: Mt. Roraimã, XI. São Paulo: Cipó, XI; Piracicaba, XII; Pirassununga, XI; San Miguel, I; Santo Amaro, III.

COLOMBIA - 2, no other data. Meta: Río Guayuriba, XII. N. de Santander: 3 km N. Chinácota, 1000 m, V.

ECUADOR - Loja.

FRENCH GUIANA - Cayenne. Mont de Kaw.

PARAGUAY - 2, no other data. Alto Paraná, Cuidad Pdte Stroessner, X-XI. Asunción. Caaguazú: Col. Sudetia, I; Mandijo, I. Cerro Amambay. Itapúa: 20 mi. N.E. Encarnación, XI, XII; 10 km S. Santa María, X. Primavera. Sapucay, XI. Villarrica.

PERU - Cerro Azul. Chanchamayo. Cuzco: Marcapata, Hacienda Cadena; Santa Isabel, XI, XII. Loreto: Pucallpa, IV, VI. Paucartambo. Pozuzo. Satipo, III. Tingo María. Valle Chanchamayo, 800 m.

VENEZUELA - 3, no other data. Arabopó, XII. Aragua: Maracay. Bolívar: El Dorado, IX; Gran Sabana, Chirima, X; Canaracuni, II; D.F.: Caracas, VI; El Valle, XI. Miranda: La Peñita, V; San Antonio de los Altos, 1350 m, XII. Tachira: Barrio El Lobo, IX; St. Elena. Yaracuy: San Mateo, VI, VII; 800 m, X.

Specimens are in: Berlin, Brussels, Chicago, Dresden, Eberswalde, Geneva, Leiden, London, Maracay, Munich, New York, Oxford, Paris, Pittsburgh, São Paulo, Tucumán, Washington, Arnaud, Glaser, Howden.

REMARKS. While this species is one of the most common and wide ranging species in the genus, most of the variation seen appears to be size related rather than related to range. A large specimen may have a larger and deeper pronotal concavity with a larger smooth area than is found in a small specimen. Also carinae are better developed in large specimens and their shapes may vary slightly. Despite this, major distinguishing characters remain fairly constant and there appears to be little difference in the male genitalia between specimens from Colombia and Argentina.

Most specimens personally collected have been taken at light shortly after sunset. Specimens taken near Chinacota, Colombia, were found burrowing in a wet, light-clay soil in an area dug out for road fill several years previously judging from the weedy, rather dense ground cover. The

few burrows found had a small but typical "push-up", were vertical and attained a depth of from 10 to 14 cm. No food or other matter was evident in any of the burrows.

38. Neoathyreus lyriferus Howden and Gill

Figures 123-125, Map 8

Neoathyreus lyriferus Howden and Gill, 1984, p. 1637.

TYPE. Male, labeled "Costa Rica, Punt., S. Vito, Las Cruces, Sept.-Mar., 1982-83, B. Gill, F. [light] I.[ntercept] T. [rap]", in H. & A. Howden collection.

MALES. Length 12.3 to 14.4 mm, greatest width 7.9 to 9.2 mm. Dorsally uniformly dark brown to black. Clypeus with anterior transverse carina, carina frequently poorly defined medially; posterior clypeal carina distinct; median tubercle very slightly anterior in position and lower than lateral tubercles, outer edges of lateral tubercles slightly convergent towards apices. Vertex flat to feebly convex, surface rugose to granulate between eyes, punctate posteriorly in some specimens. Pronotum (Fig. 123) with very small fossa on each side adjacent to anterior marginal bead behind eye, width of fossa equal to one to two times width of adjacent bead; pronotal margin between fossae with small, rounded tubercle at midline. Inner pronotal carina on each side inwardly arcuate and raised to acute angle near middle of pronotal length; apex of angle of carina separated by approximately 2.0 to 2.6 mm from angle of opposite carina; inner carina obsolete posterior to angle. Concavity largely anterior to angles of inner carinae, concavity moderately deep anteriorly with midline forming distinct groove; surface of concavity rugose-punctate, most punctures each with erect tan seta. Outer pronotal carina with anterior end positioned midway between angle of inner carina and marginal indentation at posterior angle, carina not extending anteriorly toward fovea beyond emargination of angle; posterior end of outer carina fused with posterior end of inner carina, combined carinae forming flattened, smooth, transverse band extending to indented midline, posterior edge of carina on each side of midline obtusely angulate or abruptly rounded, anterior edge anterior to angulation with small oval indentation; combined carinae posteriorly lyre-shaped. Lateral pronotal fovea on each side moderate in size, elongate, lacking carina at anterior edge; pronotal margin below fovea briefly indented, marginal bead complete. Elytron basally with three to five very feebly indicated striae; surface granulate-punctate, most punctures each with tan or brown semi-erect seta. Metasternum between middle coxae flat to feebly convex, midline slightly elevated on each side, occasionally with fine median depressed line; anterior edge of metasternum at midline sharply, obtusely angulate; metasternal surface with evenly spaced shallow coarse punctures, most punctures each with long tan seta. Fore tibia usually with six teeth on outer margin, occasionally minute seventh tooth present basally. Genitalia as in figs. 124, 125.

FEMALES. Length 11.9 to 14.5 mm, greatest width 8.3 to 9.3 mm. Females similar to males except for usual pygidial differences: surface more convex, apex more broadly rounded. The more pronounced lateral clypeal tubercles with outer margins convergent anteriorly, often differs between male and female in other species but this difference is not evident in lyriferus.

MATERIAL EXAMINED: 3 males, 11 females.

ECUADOR - Santo Domingo, IV.

Specimens are in: Glaser, Howden.

REMARKS. While the range of lyriferus appears to have a major disjunction (the species is only known from Costa Rica and Ecuador) there are only minor differences between the two populations. In my estimation minor differences in the shape of the pronotal carinae, which vary even within one population, do not warrant nomenclatural recognition.

Neoathyreus lyriferus belongs to a complex of species which includes accinctus, n. sp., and boosi, n. sp. The characters useful in distinguishing lyriferus are given in the key and comparisons are made following the descriptions of the new species.

● = 39. accinctus n. sp.
○ = 40. lepidus n. sp.
▲ = 41. acutus n. sp.
△ = 42. braziliensis n. sp.
■ = 43. inermis n. sp.
□ = 44. rufoventris n. sp.

39. Neoathyreus accinctus n. sp.

Figures 126-128, Map 9

HOLOTYPE. Male, length 14.0 mm, greatest width 8.1 mm. Dorsally dark brown. Clypeus lacking distinct anterior carina, area of carina delimited by irregular raised rugae; posterior transverse carina strongly developed; median tubercle feebly developed, very slightly anterior to line of lateral tubercles and lower; lateral tubercles pronounced, each with outer edge slanted inward, making distance between apices of lateral tubercles distinctly less than clypeal width. Vertex between eyes slightly convex near eyes, medially feebly concave to flat; surface with distinct granules, mostly separated by distance equal to diameter of two to three granules. Pronotum (Fig. 126) with small fossa on each side adjacent to anterior marginal bead behind eye, width of fossa equal to one to two times width of adjacent bead; pronotal margin between fossae elevated to small, rounded tubercle at midline. Inner pronotal carina on each side inwardly arcuate and raised to acute angle near middle of pronotal length; apex of angle of carina separated by approximately 1.5 mm from angle of opposite carina; inner carina obsolete posterior to angle. Pronotal concavity situated largely anterior to angles of inner carinae, concavity with sides concavely sloping to distinctly grooved midline; surface of concavity with scattered, small punctures each with erect tan seta. Outer pronotal carina with anterior end positioned between angle of inner carina and incurved lateral margin just anterior to posterior pronotal angle, carina anteriorly slightly closer to lateral margin than to inner carina; carina posteriorly with outer edge inwardly arcuate, about 0.3 mm from midline briefly curved anteriorly, then becoming transverse to join opposite carina; at angle formed when anterior bend becomes transverse, small, low, 0.5 mm long ridge projects anteriorly and laterally, pronotal surface just before anterior end of ridge transversely depressed; area between depression and acute angle of inner carina smooth with widely scattered, small punctures. Lateral pronotal fovea shallow, oval; pronotal margin below fovea slightly indented, marginal bead complete. Elytron lacking distinct striae on disc, surface somewhat roughened with scattered small punctures, each with semi-erect seta, surface feebly shining. Metasternum between middle coxae almost flat with slightly elevated midline, anterior edge obtusely angled, apex of angle at midline with sharp, anteriorly directed tubercle; surface of metasternum with scattered, small, shallow punctures, each with long, fine seta. Fore tibia with five teeth on outer margin. Genitalia as in figs. 127, 128.

ALLOTYPE. Female, length 15.5 mm, greatest width 8.8 mm. Similar to holotype except as follows: median clypeal tubercle slightly larger and lateral tubercles very slightly more widely separated; inner pronotal angles separated by 1.8 mm; outer pronotal carina on each side of midline more elevated (a function of size); apex of pygidium more rounded.

TYPE MATERIAL: Holotype, male, Colombia, Manizales, A.M. Patino (Paris). Allotype, female, same data as holotype (Paris).

PARATYPES: 6 males, 7 females.

COLOMBIA - 3, same data as holotype. Antioquia: Valle de Medellín, X.1941, F.L. Gallego. Cali. Chocó: Wallis. Colina Valley, nr. Buenaventura, VII.1984. Popayán, 1.VI.1938. S. Antonio. S. America, Caucathal [sic].

Paratypes are in: Berlin, Paris, Washington, Boos, Howden.

REMARKS. Characters distinguishing accinctus show little variation. The smallest specimen seen, a male, measures 12.1 mm in length and 7.4 mm in greatest width. The allotype is as large as any specimen seen. Color varies from tan to very dark brownish-black. The distance between the acute angles of the inner pronotal carinae varies from 1.4 to 1.8 mm but appears to be always less than in the closely related lyriferus in which the separation of the angles varies from 2.0 to 2.6 mm. The closest relative to accinctus is lyriferus which lacks the small anteriorly directed ridge near the posterior end of the outer carina; also in accinctus the posterior edge of the outer carina is arcuate, not angulate. Another species in the complex is panamensis (Robinson) which has the inner carina continued behind the acute central angle.

40. Neoathyreus lepidus n. sp.

Figures 129-131, Map 9

HOLOTYPE. Male, length 15.7 mm, greatest width 9.5 mm. Dorsally light reddish brown. Clypeus with anterior transverse carina, carina irregular medially, on each side of irregular section with feeble carina extending to anterior apex of median tubercle (carina appears to be atypical oblique carina); posterior transverse carina distinct, only slightly depressed between small tubercles, median tubercle slightly anterior in position and slightly higher than lateral tubercle on each side. Vertex with sharp carina at inner edge of each eye, vertex between eyes shallowly, broadly concave; surface evenly granulate, each granulation with long, erect seta at base. Pronotum (Fig. 129) with relatively large fossa on each side adjacent to anterior marginal bead behind eye; fossa longitudinally elongate, deep portion at least four times width of adjacent bead; anterior pronotal margin between fossae elevated to small conical tubercle on midline, bead forming anterior base of tubercle. Inner pronotal carina on each side atypically divided into two parts; anterior portion arising approximately 1.5 mm behind fossa, carina low and feebly developed for anterior half of length (about 1.0 mm), last 1.0 mm more strongly developed but not greatly elevated, posterior end slightly curved inwardly; posterior section of inner carina arising 0.6 mm inside (toward midline) posterior end of anterior section and 0.4 mm anterior to termination of anterior section; anterior end of inner section highest, forming rounded low ridge bent slightly inward at anterior end; carina feebly convergent with impressed midline posteriorly, carina abruptly terminating 0.7 mm before posterior pronotal margin; broad shallow concavity mostly delimited by anterior sections of inner carinae; surface of concavity granulate-punctate, becoming smooth, impunctate between posterior ends of anterior portions of inner carinae; midline of concavity with small circular depression 1.5 mm posterior to anterior tubercle. Outer pronotal carina on each side 2.0 mm in length, almost straight, positioned midway between inflexed portion of pronotal margin just anterior to posterior angle and posterior end of anterior section of inner carina. Lateral pronotal fovea with short very feeble carina at anterior edge of fovea, fovea longer than carina; fovea with feeble indentation extending toward lateral margin; margin below fovea not modified, marginal bead not broken, very slightly reduced in height below fovea. Elytron with four or five poorly defined striae, striae represented by irregular rows of punctures, two or three intervals present with surface relatively smooth, remainder of surface closely, irregular punctate; each puncture with

long, semi-erect, tan seta; surface between punctures shining. Metasternum between middle coxae feebly convex, anterior edge obtusely angulate, angle ridged at midline; midline indicated by distinct line, metasternal surface on each side with small, distinctly separated granules, each with setose punctures at posterior base. Fore tibia with six teeth on outer margin. Genitalia as in figs. 130, 131.

FEMALE. Unknown.

TYPE MATERIAL: Holotype, male, Argentina, S. del Estero, Termos de Rio Honda, 16.II.1982, H. & A. Howden (Howden).

PARATYPES: 2 males.

ARGENTINA - 1, Campo del Cielo, I.1934, Petrovitz collection; 1, Tucumán: Las Cejas, 2.IV.1966, L. Stange.

Paratypes are in: Geneva, Tucumán.

REMARKS. The male paratypes measure 13.1 to 13.4 mm in length and 8.3 to 8.7 mm in greatest width. The clypeal tubercles and connecting posterior carina are less elevated (one specimen worn) than in the holotype; the vertex is almost flat in the smaller specimen, and the small carina at the anterior edge of each lateral pronotal fovea is obsolete in both. Other major differences between the specimens are not obvious.

The odd pronotal characters, particularly the shape of the divided inner pronotal carina immediately distinguishes the species from other Neoathyreus. It is not easily placed with any other species or group. Based on some pronotal characters it is possibly closest to goyasensis, while other characters, including the characters of the male genitalia, place it near martinezorum.

The holotype was found on the ground near a 15 watt black light placed in thorn scrub near the Rio Honda.

41. Neoathyreus acutus n. sp.

Figures 132-134, Map 9

HOLOTYPE. Male, length 12.6 mm, greatest width 8.0 mm. Dorsally tan. Clypeus with anterior (oblique?) carina present only on anterior lateral thirds of clypeaus, absent medially; posterior transverse carina distinct; median tubercle moderately developed, transversely rounded, distinctly higher than small lateral tubercle on each side. Vertex between eyes very slightly concave; surface with numerous, very small granules, each with fine, erect, tan seta. Pronotum (Fig. 132) with fossa on each side adjacent to anterior marginal bead behind eye, fossa approximately as wide as adjacent marginal bead; pronotum between fossae feebly elevated to small, sharply conical tubercle on midline. Inner pronotal carina straight, elevated to obtuse, upright angle at anterior third, then lower at posterior end; pronotal concavity between inner carina elongate; concavity finely, closely granulate in anterior half, smooth, opaque in posterior half, midline impressed. Concavity ending posteriorly approximately 1.8 mm before posterior margin. Outer pronotal carina on each side present only posteriorly, carina arcuate, approximately 1.5 mm long and positioned midway between inner carina and inwardly arcuate lateral pronotal margin just anterior to posterior angle. Pronotum laterally with shallow, oval fovea; margin below fovea very slightly indented, marginal bead reduced but not broken in indentation. Elytron with two very feebly depressed striae on disc; elytral surface closely granulate-punctate, each puncture with fine,

semi-erect, tan seta. Metasternum between middle coxae feebly convex, anterior edge obtusely angled, apex of angle at midline with low, rounded keel; surface of metasternum with small, scattered, shallow punctures, each with fine, erect, long seta. Fore tibia with six teeth on outer margin, teeth more distinctly rounded at apex than in related species. Genitalia as in figs. 133, 134.

ALLOTYPE. Female, length 11.5 mm, greatest width 7.8 mm. Dorsally light brown. Similar to holotype except as follows: angle of inner pronotal carina less elevated; outer pronotal carina reduced in length, approximately 1.0 mm long; lateral pronotal margin below fovea with marginal bead complete, not reduced; pygidium with apex more rounded.

TYPE MATERIAL: Holotype, male, Bolivia, Sta. Cruz de la Sierra, 450 m, J. Steinbach, Nov. 1910, C.M. Acc. 4552 (Pittsburgh). Allotype, female, same data as holotype (Pittsburgh).

PARATYPES: 18 males, 23 females.

BOLIVIA - 2, no other data; 6, same data as holotype. Beni: Rurrenabaque, I, Wm. M. Mann. Chapare Region, 400 m, 25.VIII.1957, Zischka. Quatro Ojos, XI.1913. Santa Cruz: 500 m, 23.X.1953, XII.1957, Zischka; Buena Vista, 1922, R.C. Robert; IV.1950; El Cidral, 28.I.1962. Santa Cruz de la Sierra (= Prov. del Sara), 450 m, XI.1910, J. Steinbach.

[BOLIVIA, Pando] - Chivé, Madre de Dios, 200 m, Capit. Mailles, 1912.

PERU - [in] south east, Ehrman coll.

Paratypes are in: Berlin, Dresden, London, Munich, Ottawa, Paris, Pittsburgh, San Francisco, Washington, Arnaud, Howden.

REMARKS. While this species is fairly common in collections, variation in the series seen is not great. Size ranges from 9.0 to 12.9 mm in length and from 6.1 to 8.1 mm in greatest width. Dorsal color is uniform, varying from tan to light brown. The fore tibia may occasionally have only five teeth on the outer margin. Very small specimens have the upright obtuse angle of the inner pronotal carina scarcely indicated, while very large specimens may have the same carina very feebly sinuate behind the angulation. In other respects the series shows little variation other than that noted under the allotype.

The closest relative to acutus is probably goyasensis but that species lacks the outer pronotal carina. Neoathyreus brazilensis is also related, but the inner pronotal carina of brazilensis is directed inwardly. The almost straight inner pronotal carina and upright angle, combined with the presence of an outer carina and five or six teeth on the fore tibia will usually serve to distinguish acutus from any other uniformly tan or brown species of Neoathyreus.

42. Neoathyreus brazilensis n. sp.

Figures 135-137, Map 9

HOLOTYPE. Male, length 13.4 mm, greatest width 7.9 mm. Dorsally light brown. Clypeus with oblique anterior carina on each side, carina medially near base of median tubercle reduced in development, slightly irregular; posterior transverse carina strongly developed; median tubercle moderately developed, higher and more advanced in position than lateral tubercles. Vertex almost flat, very slightly depressed near midline; surface closely, finely granulate, most granules each with fine, erect seta at base.

Pronotum (Fig. 135) with small fossa on each side adjacent to anterior marginal bead behind eye, fossa approximately as wide as adjacent bead; margin between fossae elevated to conical tubercle at midline, tubercle arising from posterior edge of bead. Inner pronotal carina on each side inwardly, obtusely angled near middle, angle separated from opposite one by approximately 2.2 mm, inner carinae more widely separated anterior to angle than posteriorly, each inner carina extending posteriorly to 0.5 mm before posterior pronotal margin. Pronotal concavity more pronounced in anterior half, terminating posteriorly about 1.1 mm before posterior margin; surface of concavity anteriorly finely granulate-setose, posteriorly and laterally near carina smooth, opaque. Outer pronotal carina on each side with vague, fine, short, ridge just anterior to lateral fovea and distinct, sinuate posterior carina approximately 1.7 mm long; distinct portion of carina positioned midway between inner carina and pronotal margin just anterior to posterior angle. Pronotum laterally with oval fovea, margin below fovea not indented, marginal bead complete, not reduced. Elytron with two feebly elevated, mostly impunctate intervals on disc, remainder of surface closely punctate-granulate, punctures each with erect or semi-erect tan seta; surface between granules and punctures shining. Metasternum between middle coxae moderately convex, anterior edge obtusely angulate, angle at midline rounded, not keeled or tuberculate; surface of metasternum with scattered small punctures, each with long, erect, tan seta. Fore tibia with five teeth on outer margin. Genitalia as in figs. 136, 137.

ALLOTYPE. Female, length 13.0 mm, greatest width 8.1 mm. Similar to holotype except as follows: oblique clypeal carina broken, irregular medially near base of median tubercle; all clypeal tubercles slightly reduced in size and height; inner pronotal carinae lower, distance between angles 2.5 mm; pronotal concavity slightly shallower; fore tibia with indication of basal sixth tooth on outer margin; pygidium more convex, apex more rounded.

TYPE MATERIAL: Holotype, male, Brazil, S.P., Salesópolis, 850 m, Est. Biol. Boracéia, 28-29.XI.1974, light Mzusp col. (São Paulo). Allotype, female, Brazil, S. Paulo, Faz. Pau D'Alho, Itu, 12-15.XI.1960, U. Martins (São Paulo).

PARATYPES: 55 males, 76 females.

ARGENTINA - Misiones.

BRAZIL - 4, no other data; 1, same as holotype. Bahia: Cachimbo, Ch. Pujol, 1890; V. de Poll. Espírito Santo: F. Hoffman; Itapemirim, F. Ohaus S.; F. Jerusalem, 20.XI.1912, J.F. Zikan; Jetibá, XI.1963; João Neiva, X.1965. Goiás: Jataí, Faz. Aceiro, X.1962; Rio Verde. Maranhão: 50 km E. Canindé, Aldeia Aracu, V.1963, Malkin. Mato Grosso: Km 100, BR 55, 21.XI.1960, Aranjo & Martins. [Mato Grosso]: Chapada, X. Minas Gerais: Aquas Vermelhas, XII.1983, M. Alvarenga; Lambari, XI. 1924; III.1925; Uberara, Le Moult; Viçosa, X.1930; Virginha [sic], X.1950. Pará: Barbacena, Candeze coll. Rio de Janeiro: Itatiaya, F. Ohaus S.; Petrópolis, F. Ohaus S. Santa Catharina: Hansa [= Corupá], Humboldt; Rio Bonito, XI.1964, A. Maller. São Paulo: Anhembi, Faz. Barreiro Rico, XI.1965, W.D. Edmonds; Barueri, 26.XI.1954, 26.I.1955, 12.XI.1960, 5.XI.1961, K. Lenko, B. Malkin, XI, XII.64; Campinas, A. Braatz; 28.XII. 1940; Campos Jordao, Eug. Lefevre, 1200 m, 13-20.XI.1952, d'Almeida & Pd. Pereira; Cipó, 11.II.1972, 18.XI.1972, 16.I.1973, V.N. Alin; (Coqueiros), Ribeirão Prêto, X.1954, 1956, M.P. Barretto; Itu, Faz. Pau D'Alho, 15.XI.1960, 29.X.1965, U. Martins, Baisi, 12-15.XI.1960, M.A. Vulcano; 10.I.1960, Pd. Pereira; Itu, Vila Nova, I.1963, U. Martins; Metz

[sic]; Pindamonhangaba, Eugenio Lefevre, 26.X.1962; Piquete; Piracicaba, 22.XII.1965, C.A. Triplehorn; Pirassununga, 4.X.47, Schubart; Rio Claro, XII.1940, F. Pereira; Salesópolis, B. Malkin, X; Santo Amaro, III.1957, J. Lane; Sorocaba, X.1935, Mendez; Tremembé, XII.1939, 28.I.1940, Halik; Ypiranga, F. Ohaus S.

Paratypes are in: Berlin, Brussels, Dresden, Eberswalde, Geneva, London, Oxford, Paris, Pittsburgh, São Paulo, Tucumán, Washington, Arnaud, Glaser, Hardy, Howden.

REMARKS. Except for size which varies from 9.1 to 13.6 mm in length and from 7.1 to 8.3 mm in greatest width, most of the morphological differences are included in the descriptions of the holotype and allotype. The inner pronotal carinae in very small specimens lack a distinct angle and isolated small specimens are often difficult to determine, particularly females. If the characters of the clypeus and male genitalia are given considerable weight, brazilensis is related to lanuginosus while the inner pronotal carina relates brazilensis to sexdentatus.

Neoathyreus brazilensis is a relatively abundant species that has been represented in collections for many years. It has been misidentified under a variety of names including excavatus and sexdentatus. However none of these older names can be applied to the present species. Information on labels show that a number of specimens were collected at light.

43. Neoathyreus inermis n. sp.

Figures 138-140, Map 9

HOLOTYPE. Male, length 8.4 mm, greatest width 5.7 mm. Dorsally very dark brown with labrum, clypeus, and lateral edges of pronotum reddish brown. Clypeus with poorly defined anterior transverse carina, posterior transverse carina distinct; median and lateral clypeal tubercles feebly developed, represented by thickening of carina at median and lateral angles; median tubercle slightly anterior to lateral tubercles, all tubercles of similar height. Vertex between eyes with central third flat to very feebly concave; surface closely granulate. Pronotum (Fig. 138) with moderate-sized fossa on each side contiguous with anterior marginal bead behind eye, diameter of fossa equal to two to three times width of adjacent bead; pronotal margin between fossae elevated to small, rounded tubercle at midline. Inner pronotal carina of uniform height, low, strongly convex in cross section, 0.2 to 0.3 mm wide; anterior ends of inner carinae widely separated, then gradually converging to pronotal midpoint, thence almost parallel to posterior ends. Pronotal concavity very shallow, limited to anterior third of pronotum between inner carinae; posterior edge of concavity delimited by oval smooth areas on each side of slightly impressed midline; remainder of surface of concavity closely granulate. Outer pronotal carina on each side limited to posterior half of pronotum, similar in height and appearance to inner carina; carina arcuate, approximately 1.3 mm long, positioned midway between inner carina and lateral pronotal margin just before posterior angle. Lateral pronotal fovea shallow, almost circular, margin below fovea shallowly indented, marginal bead reduced and very briefly broken in indentation. Elytron lacking striae on disc, surface closely, coarsely punctate; punctures separated by less than one diameter, each puncture with fine, semi-erect tan seta; surface between punctures shining. Metasternum between middle coxae flat, midline very slightly elevated; anterior edge

obtusely angled, angle at midline with low keel; surface of metasternum with unusually widely separated, shallow punctures, each with long, erect seta. Fore tibia with eight teeth on outer margin. Genitalia as in figs. 139, 140.

FEMALE. Unknown.

TYPE MATERIAL: Holotype, male, Brazil, Hyutanahã, Rio Purus, S.M. Klages, March 1922, Carn. Mus. Acc. 6963. (Pittsburgh).

PARATYPE: 1 male.

PERU - Loreto: Ucayali, R., Yarina Cocha, 23.V.1957, Peter Hocking.

Paratype is in: Chicago.

REMARKS. The single male paratype is approximately the same size as the holotype. It varies from the holotype in being dorsally reddish-brown except for the brownish-black smooth posterior edge of the pronotal concavity and the adjacent portion of the inner carinae. The outer edge of the fore tibia has seven teeth instead of the eight found on the holotype. Otherwise the two specimens are similar.

Neoathyreus inermis is most closely related to obscurus, but differs from that species in size (smaller) and in having seven or eight teeth on the fore tibia; obscurus has four with a fifth sometimes indicated. The large number of teeth on the fore tibia of inermis combined with its small size and the shape of the pronotal carinae will usually distinguish the species from others in the genus.

44. Neoathyreus rufoventris n. sp.

Figures 141-144, Map 9

HOLOTYPE. Male, length 14.7 mm, greatest width 8.6 mm. Dorsally black, ventrally mostly reddish brown. Clypeus worn, oblique carina indicated, extending to anterior apex of moderately sized median tubercle, posterior carina on each side of median tubercle pronounced; lateral tubercle on each side low (worn). Vertex between eyes shallowly concave, surface rugose or with mixed granules and punctures, most depressions or punctures each with short brown seta. Pronotum (Figs. 141, 142) with small fossa on each side contiguous with anterior marginal bead behind eye, width of fossa approximately equal to width of adjacent bead; anterior pronotal margin between fossae upwardly, broadly, transversely arcuate, highest at midline; midline lacking tubercle or keel, not modified. Inner pronotal carina on each side arising about 1.0 mm behind fossa, most widely separated from opposite carina anteriorly; carina feebly inwardly arcuate and elevated to abrupt, obtuse angle near middle, then gradually reduced in height to posterior end 1.1 mm before posterior pronotal margin; concavity longer than wide, granulate in anterior half, smooth posteriorly; midline indented in posterior half. Outer pronotal carina on each side present above inwardly arcuate portion of posterior pronotal angle, carina slightly closer to margin than to adjacent portion of inner carina; outer carina approximately 1.3 to 1.4 mm long, anterior end reduced, gradually disappearing. Lateral pronotal fovea on each side poorly defined, shallow, pronotal margin below fovea slightly indented, bead reduced in size in indentation but not interrupted or broken. Elytron with two or three vaguely indented striae on disc; entire surface of elytron except for umbone closely, coarsely, contiguously punctate, most punctures each with short semi-erect brown seta. Metasternum between middle coxae flat, feebly elevated medially along midline, anterior

edge at midline sharply, obtusely angulate; surface of metasternum with scattered shallow punctures, each with long brown seta. Fore tibia worn, four teeth distinct, small fifth basal tooth vaguely indicated. Genitalia as in figs. 143, 144.

FEMALE. Unknown.

TYPE MATERIAL: Holotype, male, [Peru], Pozuzo, Coll. Dr. Ondrej (Chicago).

PARATYPE: 1 male.

PERU - Chanchamayo, F6032 Bassler Collection.

Paratype is in: Washington.

REMARKS. The single male paratype is 12.2 mm long and 7.1 mm wide. It is less well developed than the holotype but is also less worn. The oblique clypeal carina is feebly developed and there are six teeth on the outer margin of the fore tibia. The other distinctive characters do not differ greatly from those described for the holotype.

Neoathyreus rufoventris superficially resembles several species occurring in Peru, Ecuador or southern Colombia. However the combination of characters found in rufoventris does not seem to fall within the possible limits of variation of any other species I have seen. It appears externally to be close to rufobrunneus but differs by having the lateral margin of the pronotum unmodified and also by having very distinctive male genitalia.

ACKNOWLEDGMENTS

I would first like to extend my thanks for the help given me by those individuals and institutions listed under the heading "Collections Studied". Without their generous cooperation this study would not have been feasible. I would like to particularly acknowledge the generous help and hospitality afforded me and my wife, Anne, by Antonio Martínez, his wife Juana, and his family during a seven-week visit to Argentina in 1982. During this period all of us were hosted for several weeks by the Instituto de Investigaciones Entomologicas Salta (INESALT). While there Rdo. P. Gregorio J. Williner and Dr. Manuel J. Viana, both members of INESALT were most helpful. In producing this work the assistance of Mr. L. Ling with the Scanning Electron Micrographs, plates and maps and Mrs. Betty Perry with the typing of the manuscript has been invaluable. The laboratory portion of this work has been supported by an operating grant from the National Sciences and Engineering Research Council of Canada.

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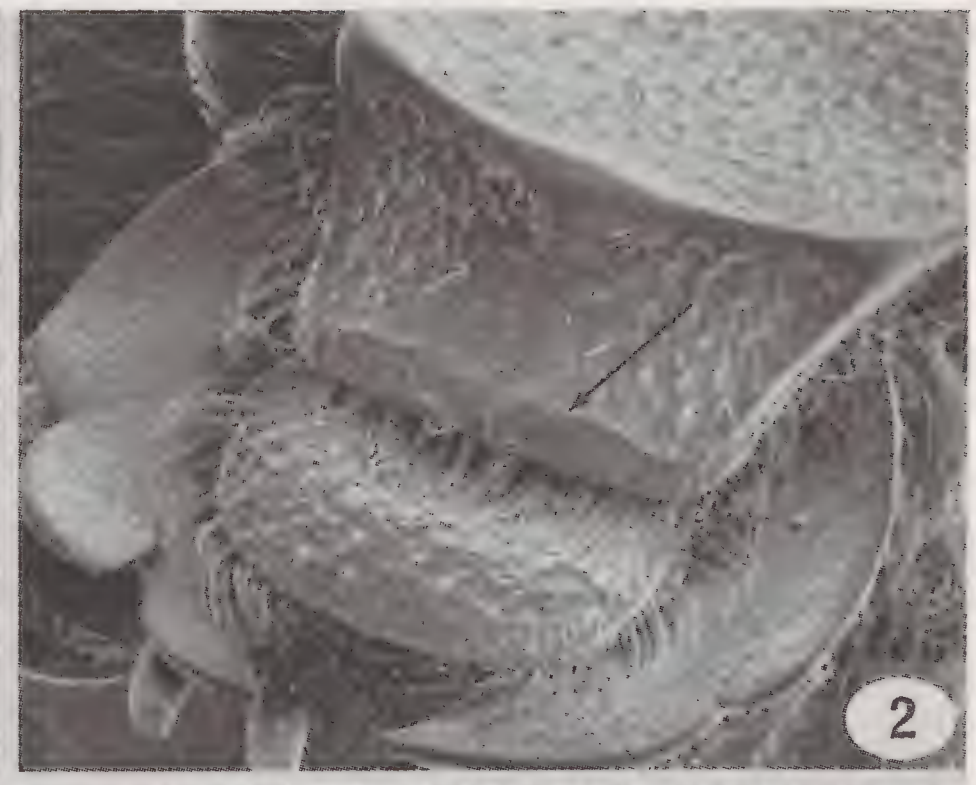
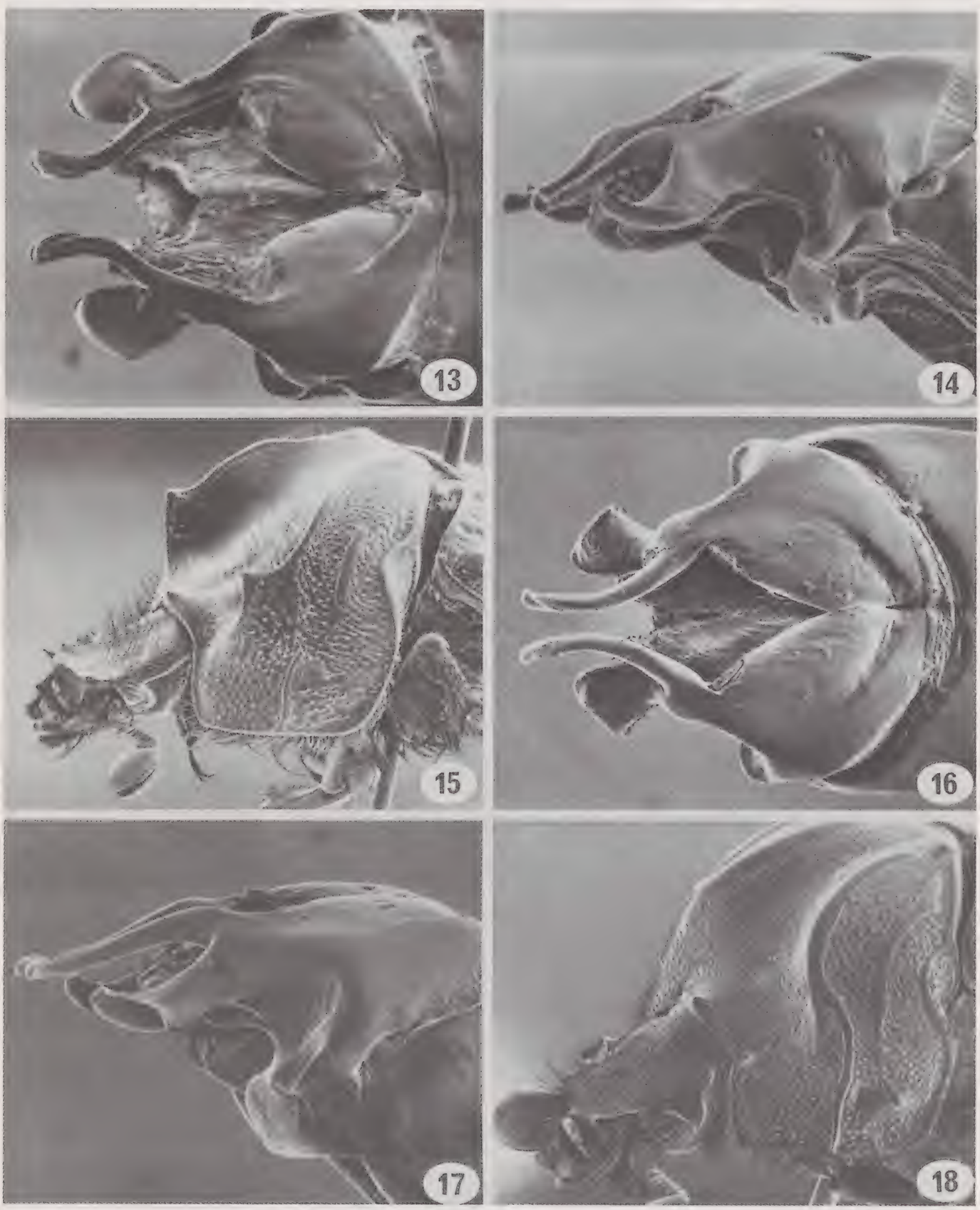


Fig. 1. Oblique clypeal carina, sexdentatus (Laporte). Fig. 2. Anterior transverse clypeal carina, lanuginosus (Klug). Fig. 3. Irregular, broken, oblique, clypeal carina, excavatus (Laporte). Fig. 4. Indented lateral pronotal margin, marginal bead interrupted, excavatus (Laporte). Fig. 5. Fore tibia with four teeth, excavatus (Laporte). Fig. 6. Fore tibia with six teeth, lanuginosus (Klug).

Figs. 7-10. Neoathyreus glaseri n. sp. 7, 8. Male, head and pronotum; 9. Male genitalia, dorsal view; 10. Male genitalia, lateral view. Figs. 11, 12. Neoathyreus arribalzagai (Martínez). 11. Male, head and pronotum; 12. Apical segment of hind tarsus.



Figs. 13, 14. Neoathyreus arribalzagai (Martínez). 13. Male genitalia, dorsal view; 14. Male genitalia, lateral view. Figs. 15-17. Neoathyreus flavithorax (Arribalzaga). 15. Male, head and pronotum; 16. Male genitalia, dorsal view; 17. Male genitalia, lateral view. Fig. 18. Neoathyreus viridis (Boucomont). 18. Male, head and pronotum.

Figs. 19, 20. Neoathyreus viridis (Boucomont). 19. Male genitalia, dorsal view; 20. Male genitalia, lateral view. Fig. 21. Neoathyreus anfractus n. sp. 21. Female, head and pronotum. Figs. 22-24. Neoathyreus latidorsalis n. sp. 22, 23. Male, head and pronotum; 24. Male genitalia, dorsal view.

Fig. 25. Neoathyreus latidorsalis n. sp. 25. Male genitalia, lateral view. Figs. 26-28. Neoathyreus purpureipennis (Westwood). 26. Male, head and pronotum; 27. Male genitalia, dorsal view; 28. Male genitalia, lateral view. Figs. 29, 30. Neoathyreus anthracinus (Klug). 29. Male, head and pronotum; 30. Male genitalia, dorsal view.

Fig. 31. Neoathyreus anthracinus (Klug). 31. Male genitalia, lateral view. Figs. 32-34. Neoathyreus cuspinotatus n. sp. 32. Male, head and pronotum; 33. Male genitalia, dorsal view; 34. Male genitalia, lateral view. Figs. 35, 36. Neoathyreus bidentatus (Macleay). 35. Male, head and pronotum; 36. Male genitalia, dorsal view.

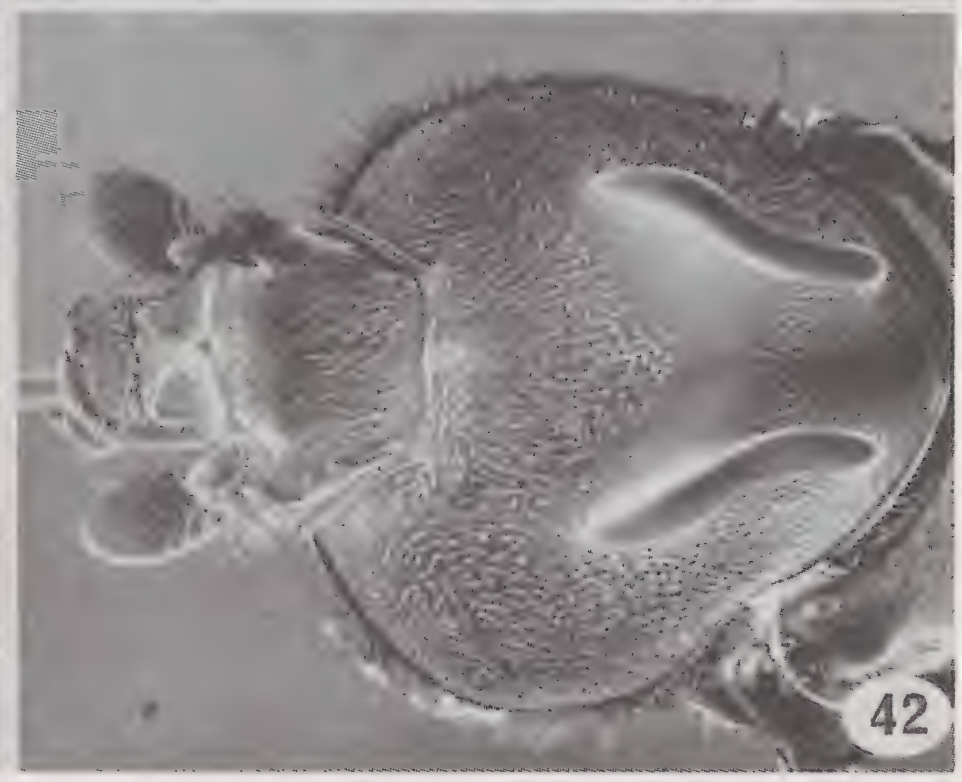
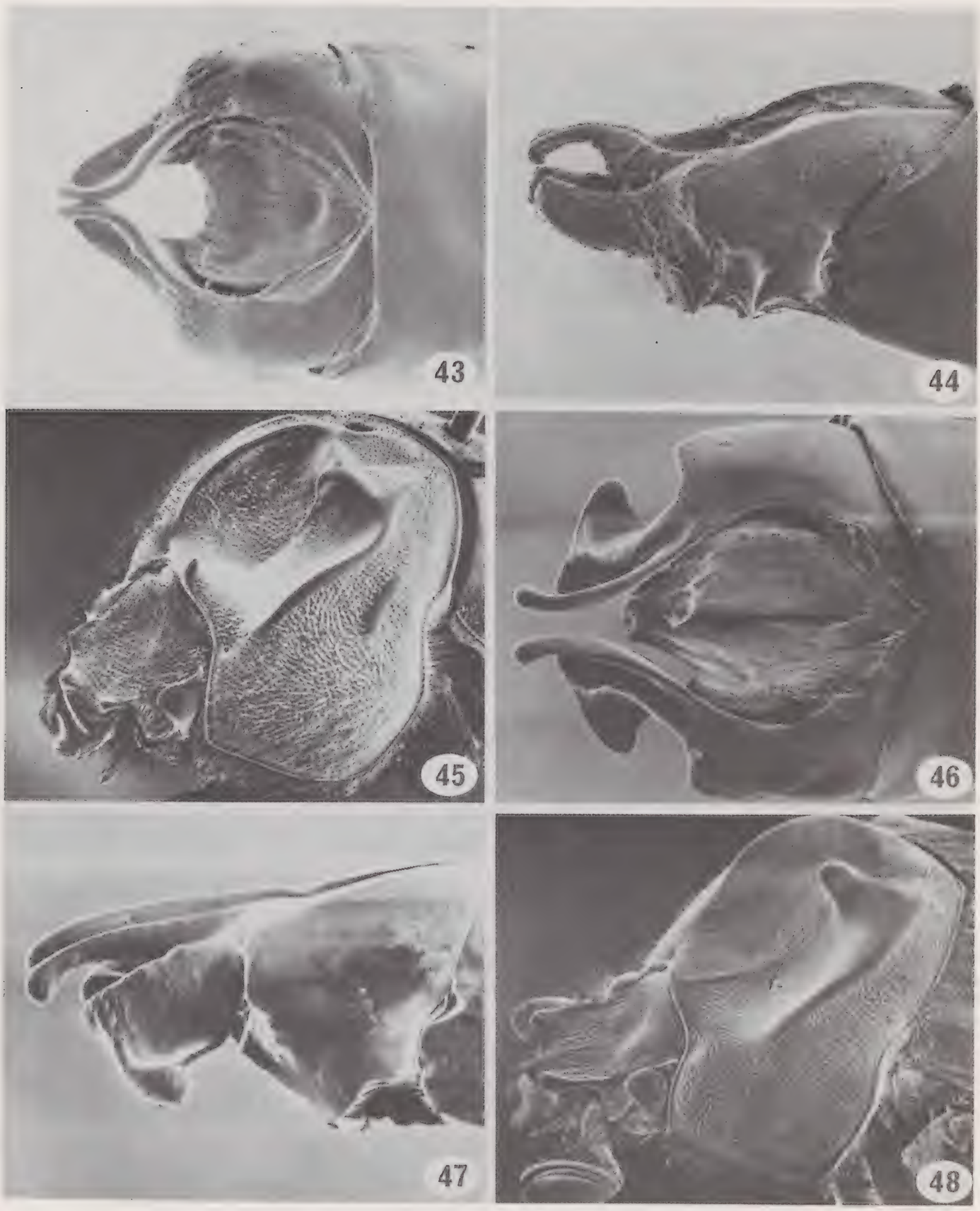


Fig. 37. Neoathyreus bidentatus (Macleay). 37. Male genitalia, lateral view. Figs. 38-40. Neoathyreus sexdentatus (Laporte). 38. Male, head and pronotum; 39. Male genitalia, dorsal view; 40. Male genitalia, lateral view. Figs. 41, 42. Neoathyreus centromaculatus (Felsche). 41, 42. Male, head and pronotum.

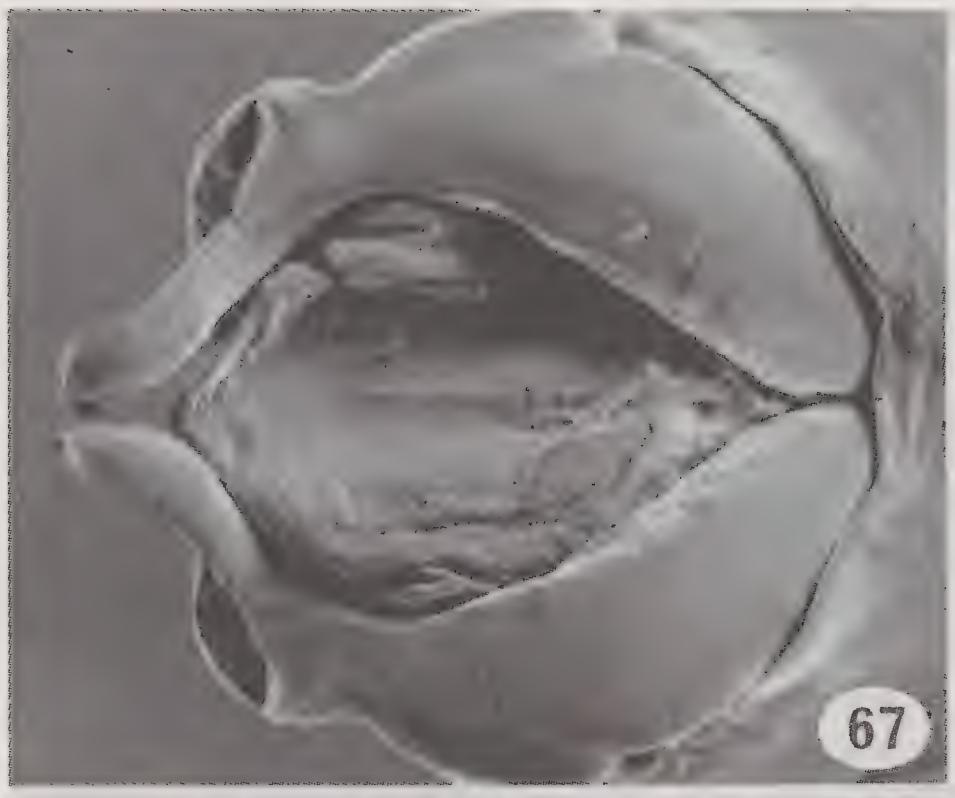


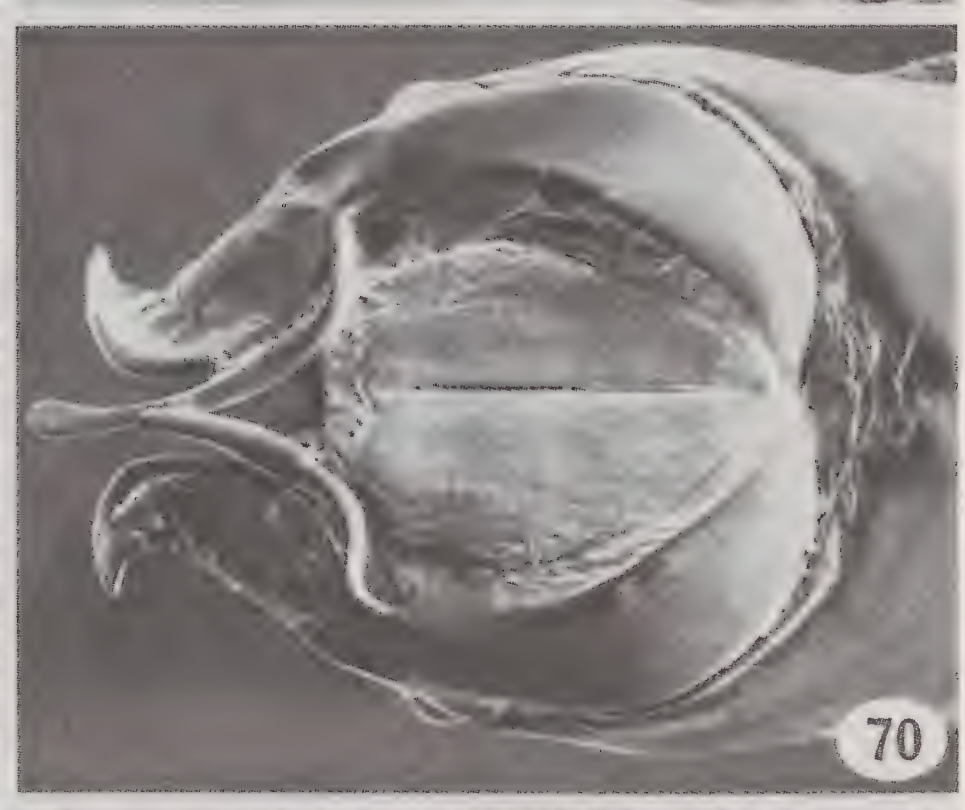
Figs. 43, 44. Neoathyreus centromaculatus (Felsche). 43. Male genitalia, dorsal view; 44. Male genitalia, lateral view. Figs. 45-47. Neoathyreus peckorum n. sp. 45. Male, head and pronotum; 46. Male genitalia, dorsal view; 47. Male genitalia, lateral view. Fig. 48. Neoathyreus corniculatus (Felsche). 48. Male, head and pronotum.

Figs. 49, 50. Neoathyreus corniculatus (Felsche). 49. Male genitalia, dorsal view; 50. Male genitalia, lateral view. Figs. 51-53. Neoathyreus lobus n. sp. 51. Male, head and pronotum; 52. Male genitalia, dorsal view; 53. Male genitalia, lateral view. Fig. 54. Neoathyreus reichii (Westwood). 54. Male, head and pronotum.

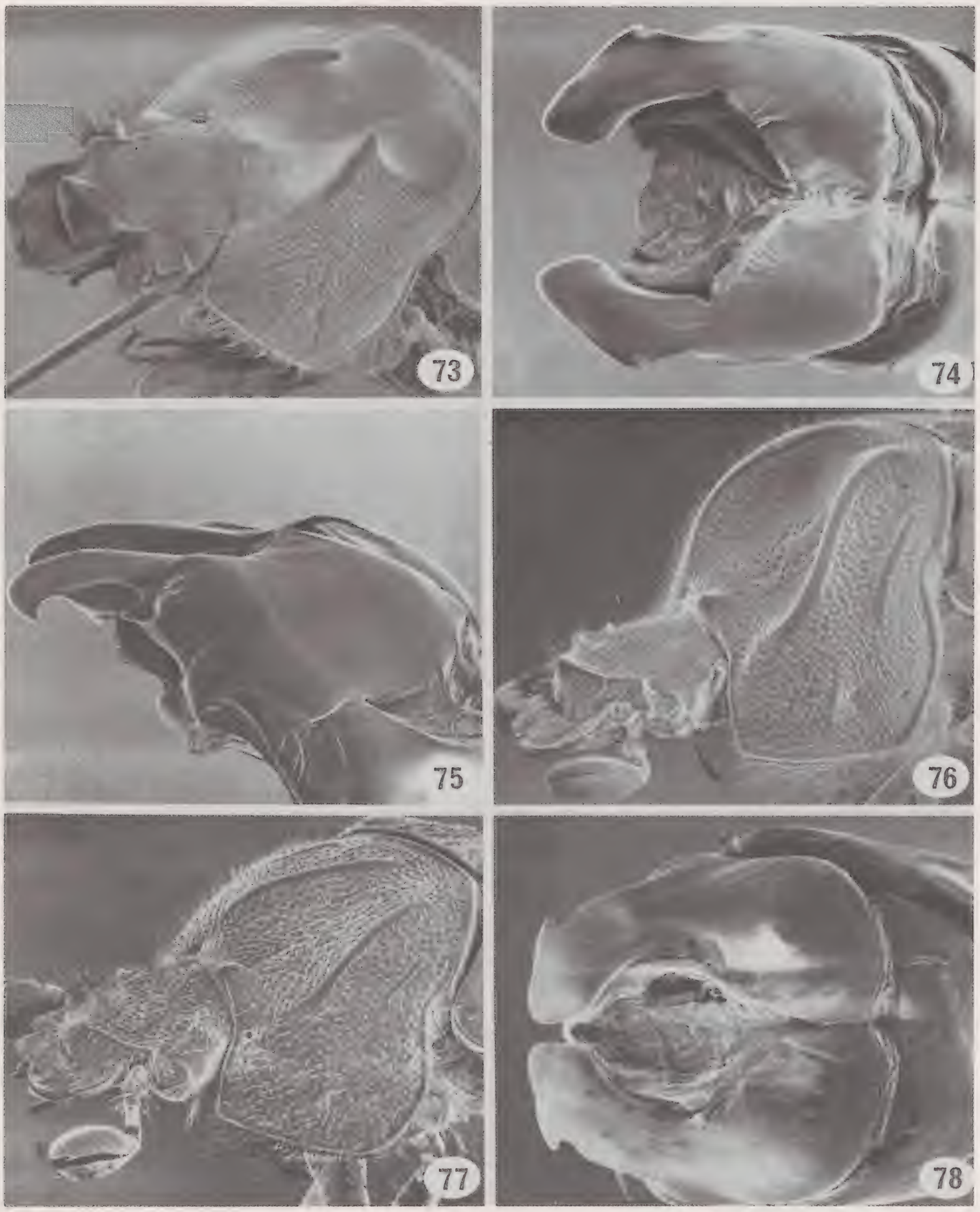
Figs. 55-57. Neoathyreus reichii (Westwood). 55. Female, head and pronotum; 56. Male genitalia, dorsal view; 57. Male genitalia, lateral view. Figs. 58-60. Neoathyreus pholas (Westwood). 58. Male, head and pronotum; 59. Male genitalia, dorsal view; 60. Male genitalia, lateral view.

Figs. 61-65. Neoathyreus centralis (Westwood). 61. Male, head and pronotum; 62, 63. Female, head and pronotum; 64. Male genitalia, dorsal view; 65. Male genitalia, lateral view. Fig. 66. Neoathyreus lingi n. sp. 66. Female, head and pronotum.





Figs. 67, 68. Neoathyreus lingi n. sp. 67. Male genitalia, dorsal view; 68. Male genitalia, lateral view. Figs. 69-71. Neoathyreus goyasensis (Boucomont). 69. Male, head and pronotum; 70. Male genitalia, dorsal view; 71. Male genitalia, lateral view. Fig. 72. Neoathyreus boosi n. sp. 72. Female, head and pronotum.



Figs. 73-75. Neoathyreus catharinae (Bates). 73. Male, head and pronotum; 74. Male genitalia, dorsal view; 75. Male genitalia, lateral view. Figs. 76-78. Neoathyreus corinthius (Klug). 76. Male, head and pronotum; 77. Female, head and pronotum; 78. Male genitalia, dorsal view.

Fig. 79. Neoathyreus corinthius (Klug). 79. Male genitalia, lateral view. Figs. 80–82. Neoathyreus tridentatus (Macleay). 80. Male, head and pronotum; 81. Male genitalia, dorsal view; 82. Male genitalia, lateral view. Figs. 83, 84. Neoathyreus politus n. sp. 83. Male, head and pronotum; 84. Male genitalia, dorsal view.

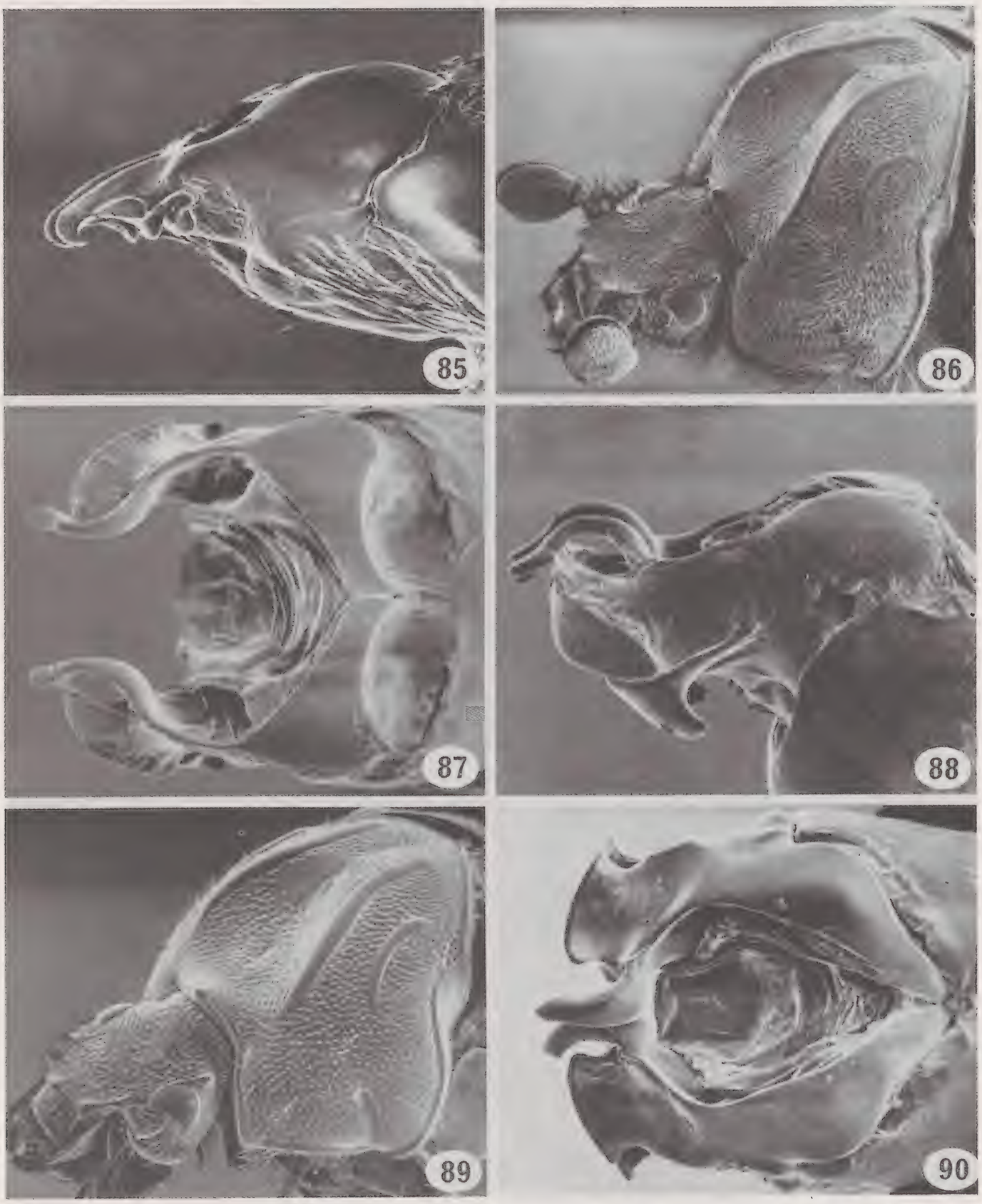


Fig. 85. Neoathyreus politus n. sp. 85. Male genitalia, lateral view. Figs. 86-88. Neoathyreus excavatus (Laporte). 86. Male, head and pronotum; 87. Male genitalia, dorsal view; 88. Male genitalia, lateral view. Figs. 89, 90. Neoathyreus lanei (Martínez). 89. Male, head and pronotum; 90. Male genitalia, dorsal view.

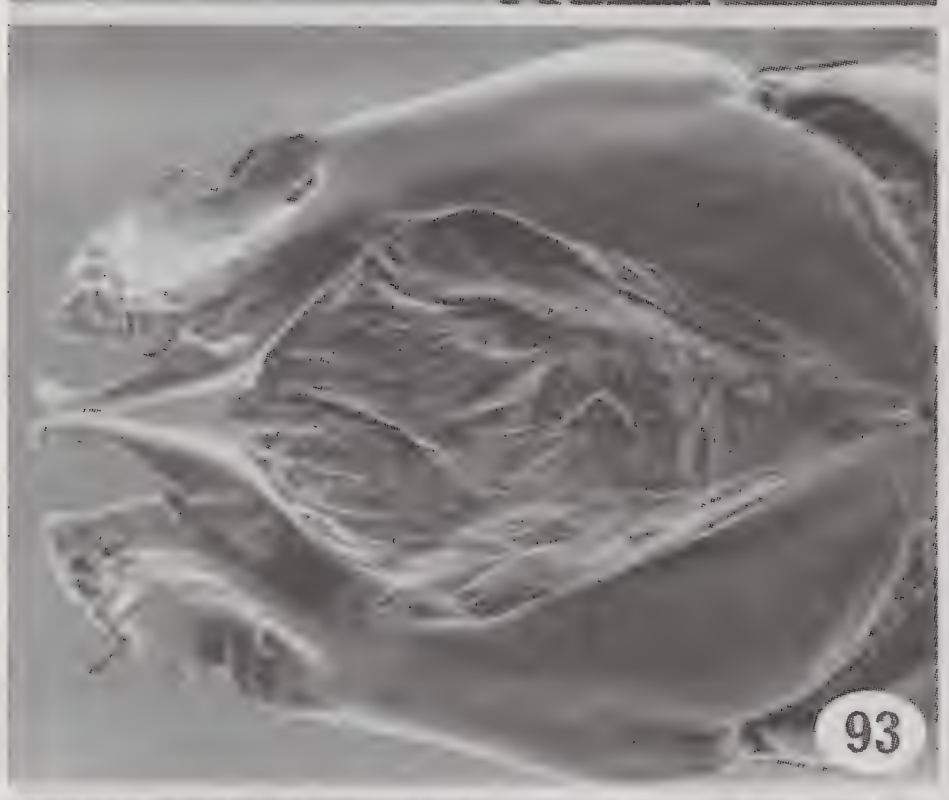
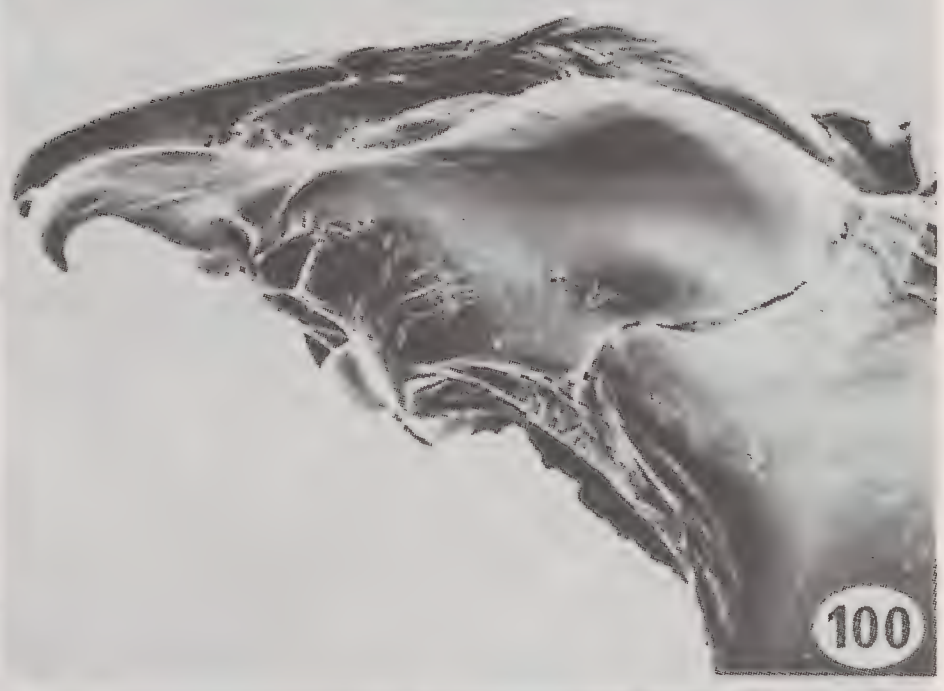


Fig. 91. Neoathyreus lanei (Martinez). 91. Male genitalia, lateral view. Figs. 92-94. Neoathyreus obscurus n. sp. 92. Male, head and pronotum; 93. Male genitalia, dorsal view; 94. Male genitalia, lateral view. Figs. 95, 96. Neoathyreus ornatus n. sp. 95. Male, head and pronotum; 96. Male genitalia, dorsal view.



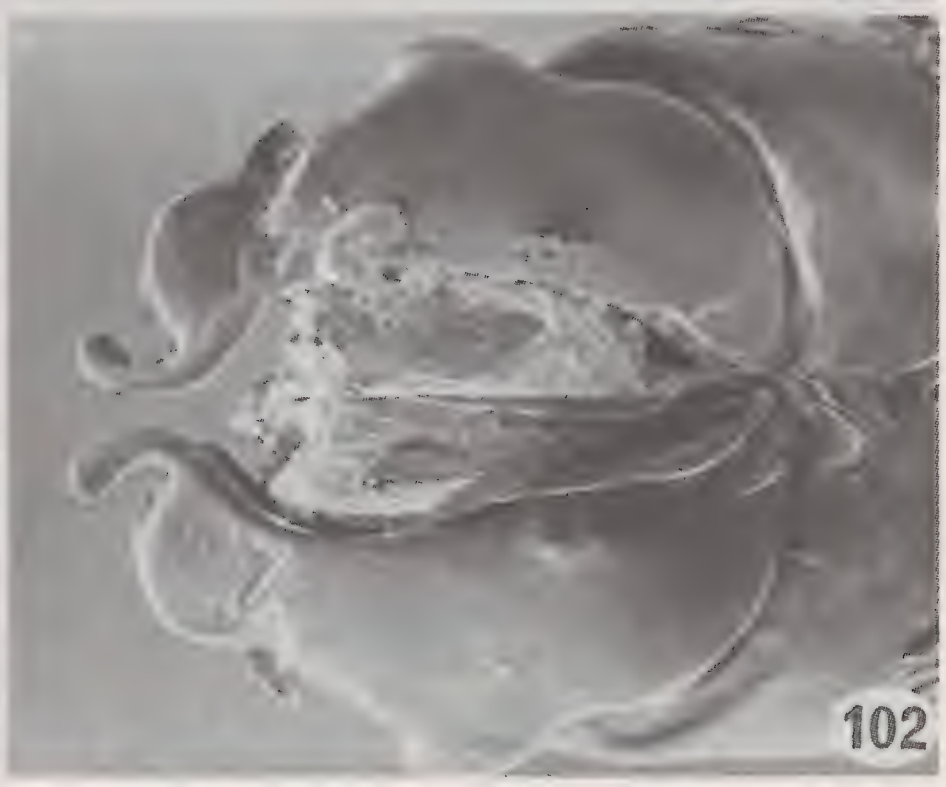
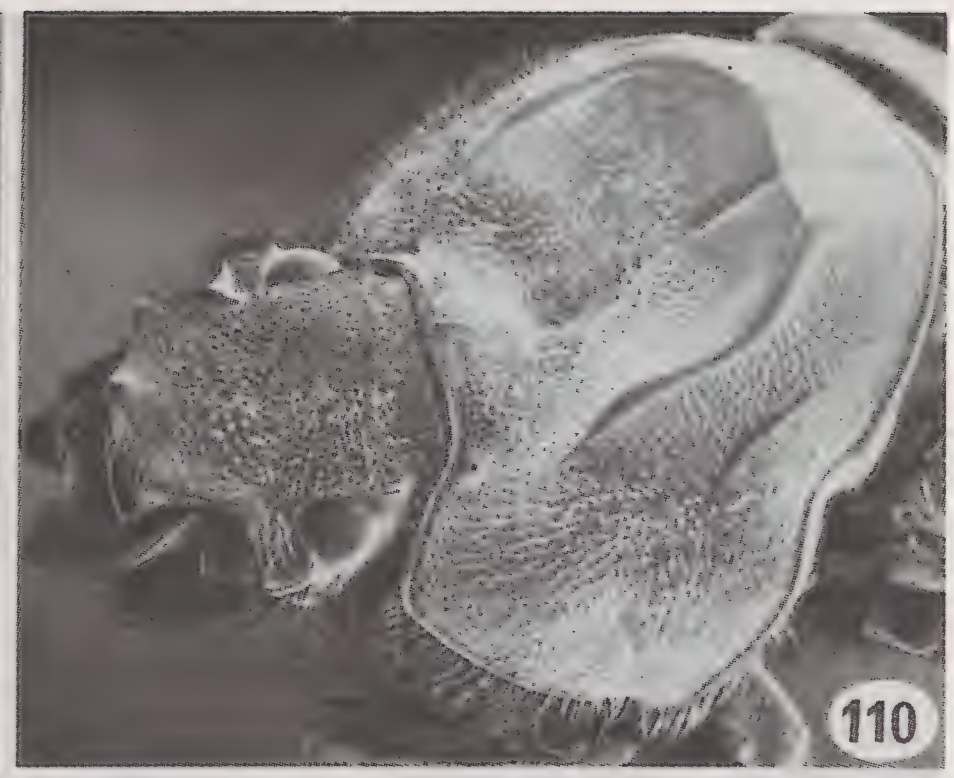
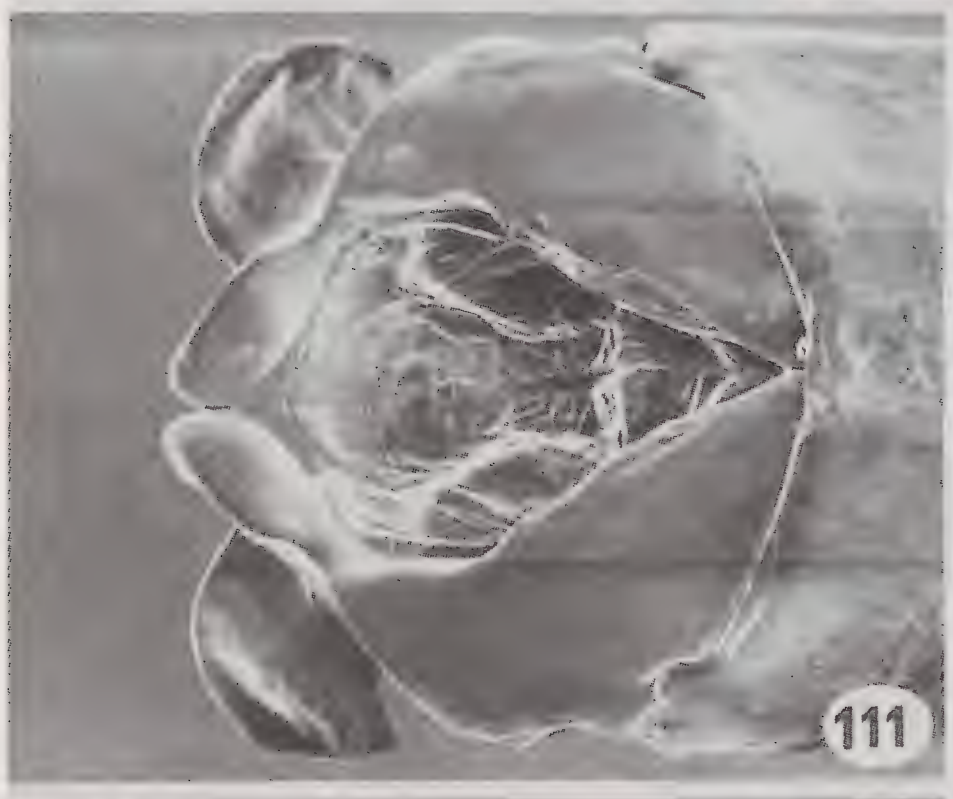


Fig. 97. Neoathyreus ornatus n. sp. 97. Male genitalia, lateral view. Figs. 98-100. Neoathyreus caesariatus n. sp. 98. Male, head and pronotum; 99. Male genitalia, dorsal view; 100. Male genitalia, lateral view. Figs. 101, 102. Neoathyreus illotus n. sp. 101. Male, head and pronotum; 102. Male genitalia, dorsal view.

Fig. 103. Neoathyreus illotus n. sp. 103. Male genitalia, lateral view. Figs. 104-106. Neoathyreus versicolor n. sp. 104. Male, head and pronotum; 105. Male genitalia, dorsal view; 106. Male genitalia, lateral view. Figs. 107, 108. Neoathyreus martinezorum n. sp. 107. Male, head and pronotum; 108. Male genitalia, dorsal view.





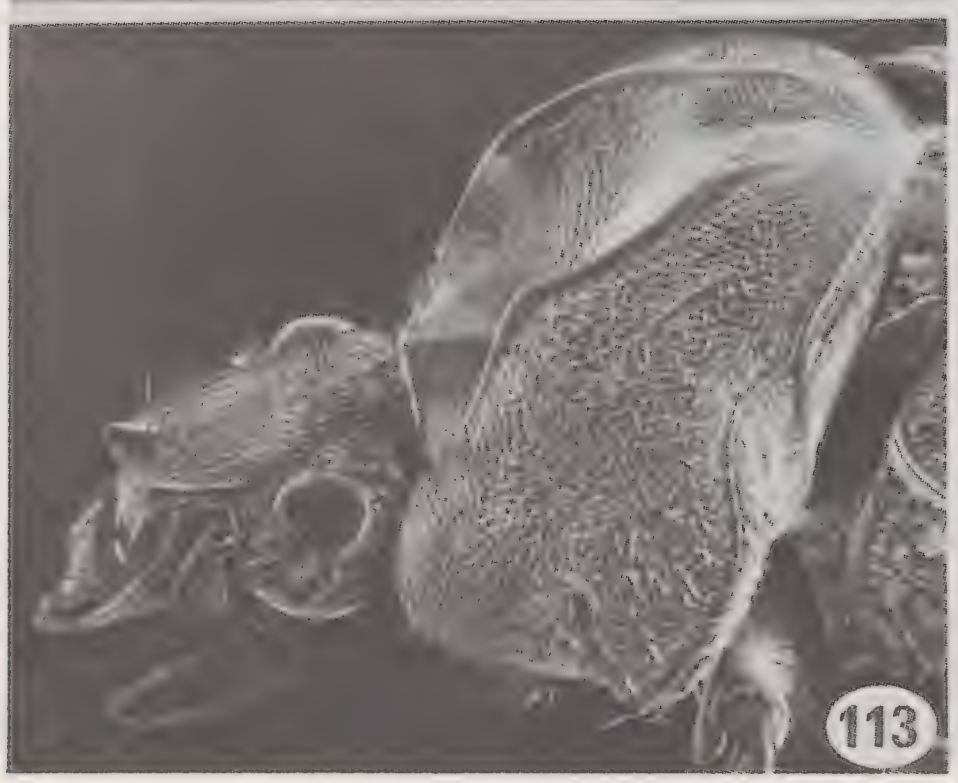


Fig. 109. Neoathyreus martinezorum n. sp. 109. Male genitalia, lateral view. Figs. 110-112. Neoathyreus latecavatus (Boucomont). 110. Male, head and pronotum; 111. Male genitalia, dorsal view; 112. Male genitalia, lateral view. Figs. 113, 114. Neoathyreus rufobrunneus n. sp. 113. Male, head and pronotum; 114. Male genitalia, dorsal view.

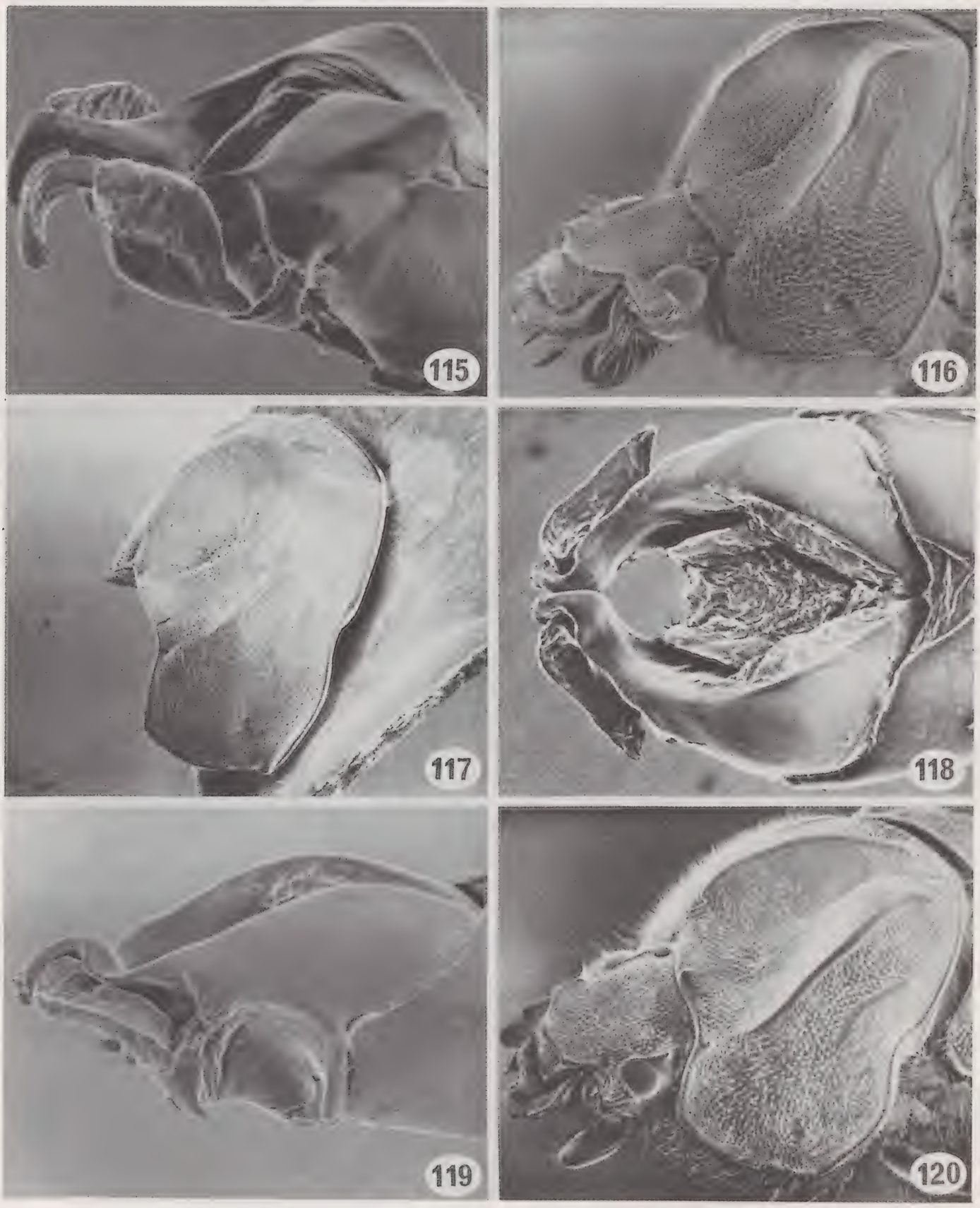
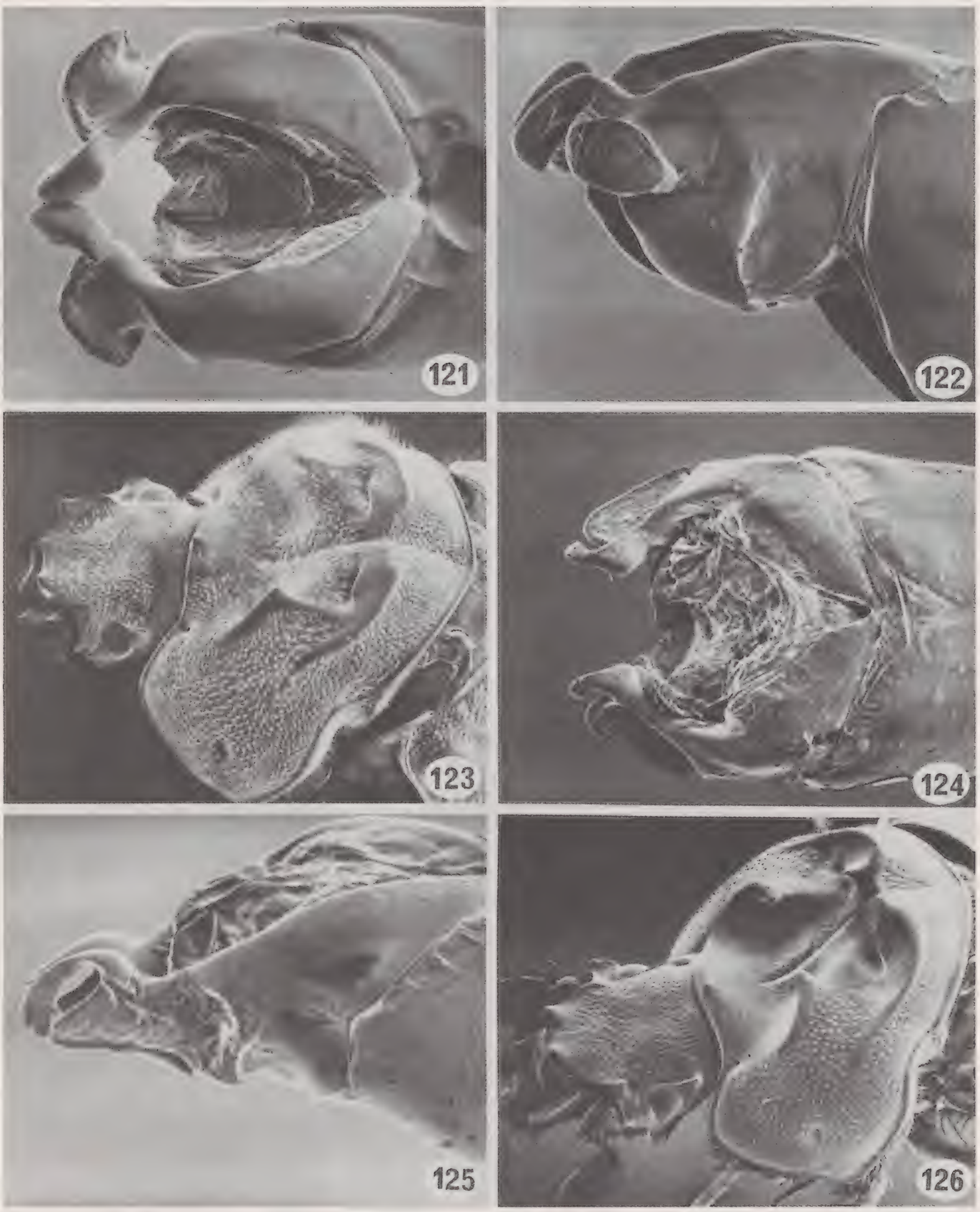
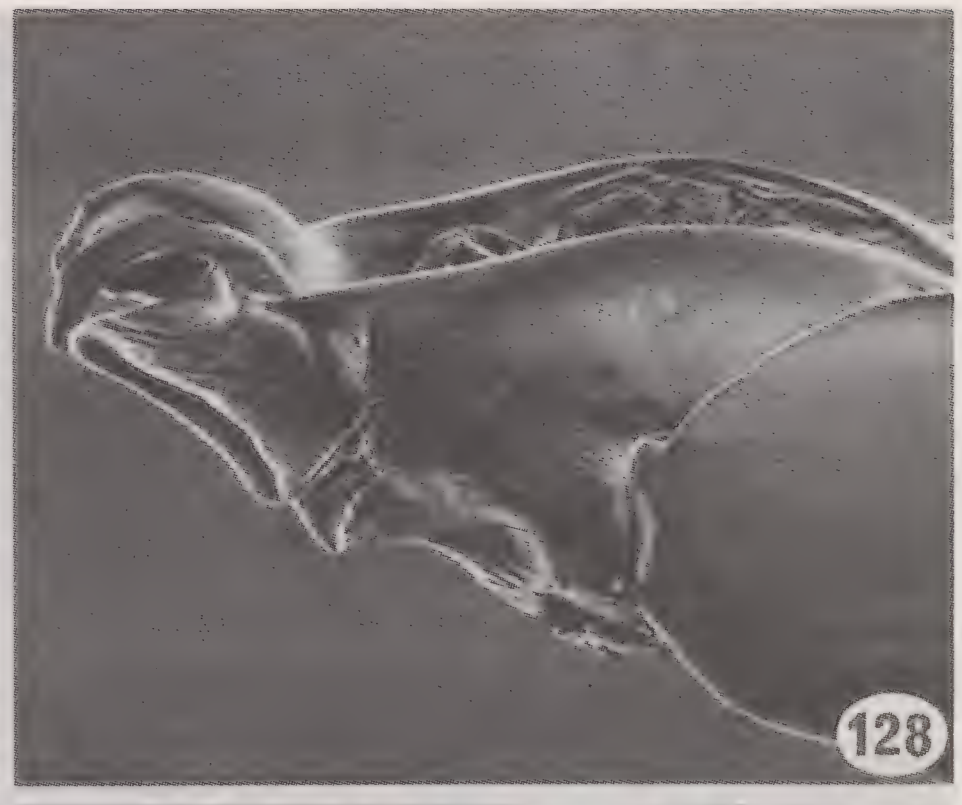
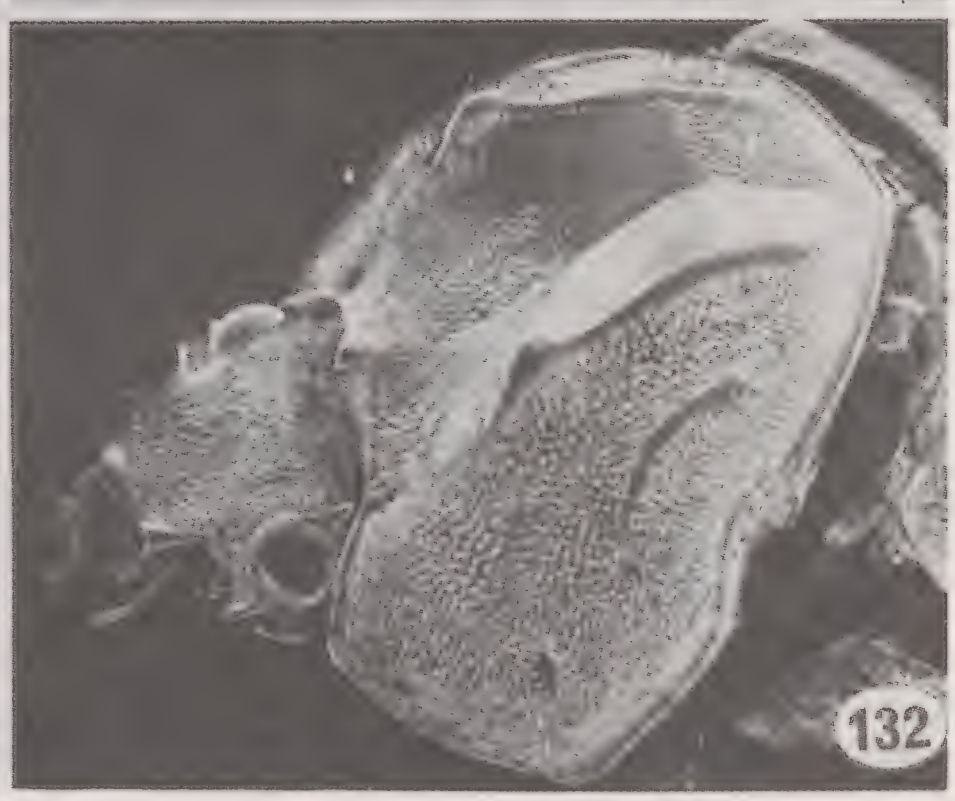


Fig. 115. Neoathyreus rufobrunneus n. sp. 115. Male genitalia, lateral view. Figs. 116-119. Neoathyreus perryae n. sp. 116. Male, head and pronotum; 117. Fossil, pronotum; 118. Male genitalia, dorsal view; 119. Male genitalia, lateral view. Fig. 120. Neoathyreus lanuginosus (Klug). 120. Male, head and pronotum.



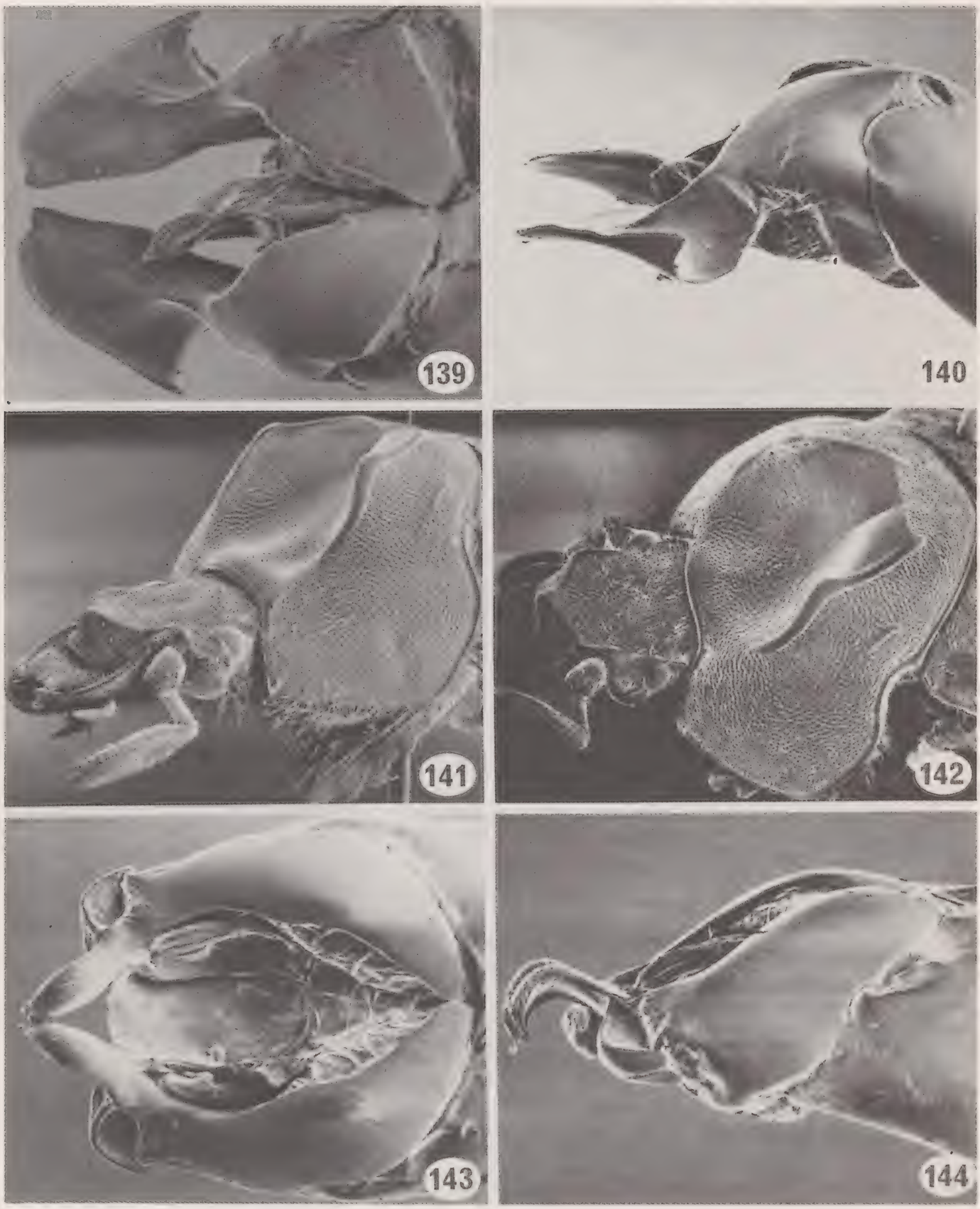
Figs. 121, 122. Neoathyreus lanuginosus (Klug). 121. Male genitalia, dorsal view; 122. Male genitalia, lateral view. Figs. 123-125. Neoathyreus lyriferus Howden & Gill. 123. Male, head and pronotum; 124. Male genitalia, dorsal view; 125. Male genitalia, lateral view. Fig. 126. Neoathyreus accinctus n. sp. 126. Male, head and pronotum.





Figs. 127, 128. Neoathyreus accinctus n. sp. 127. Male genitalia, dorsal view; 128. Male genitalia, lateral view. Figs. 129-131. Neoathyreus lepidus n. sp. 129. Male, head and pronotum; 130. Male genitalia, dorsal view; 131. Male genitalia, lateral view. Fig. 132. Neoathyreus acutus n. sp. 132. Male, head and pronotum.

Figs. 133, 134. Neoathyreus acutus n. sp. 133. Male genitalia, dorsal view; 134. Male genitalia, lateral view. Figs. 135-137. Neoathyreus brazilensis n. sp. 135. Male, head and pronotum; 136. Male genitalia, dorsal view; 137. Male genitalia, lateral view. Fig. 138. Neoathyreus inermis n. sp. 138. Male, head and pronotum.



Figs. 139, 140. Neoathyreus inermis n. sp. 139. Male genitalia, dorsal view; 140. Male genitalia, lateral view. Figs. 141-144. Neoathyreus rufoventris n. sp. 141, 142. Male, head and pronotum; 143. Male genitalia, dorsal view; 144. Male genitalia, lateral view.